EFFECT OF SELENIUM YEAST AND/OR VITAMIN E SUPPLEMENTED RATIONS ON SOME PHYSIOLOGICAL RESPONSES OF POST-LAMBING OSSIMI EWES UNDER TWO DIFFERENT HOUSING SYSTEMS

M.Y. Mohamed[1], E.M.M. Ibrahim[1] and A.M. Abd El-Mola[2]

1) Animal Production Research Institute (APRI), Ministry of Agric., Dokki, Giza, Egypt.

2) Department of Animal Production, Faculty of Agriculture, Fayoum University, Fayoum, Egypt.

(Received 17/5/2017, accepted 1/7/2017)

SUMMARY

This study was carried out to investigate the effect selenium yeast and/or vitamin E supplemented rations under two different housing types on reproductive performance of post-lambing Ossimi ewes. Along thirty days pre-lambing, eighty pregnant Ossimi ewes averaged 40.38±0.93 and 39.49±1.12kg live body weight were housed under two different housing systems, the first (semi open with concrete floor and roofed with west-east direction, 1st H) and the second (fully shaded roofed with single asbestos sheets and was topped with rice straw bales and natural earthen ground with north-south direction, 2nd H) housing type, respectively. Ewes were divided into two equal groups (40 ewes each) according to age, body weight and parity. Each group was settled in one of the housing type and randomly divided into four subgroups (ten ewes per each); group A was kept as a control and was fed the basal diet consist of roughage (rice straw) and concentrate mixture, group B selenium yeast (SY) was fed the basal diet supplemented with 0.3 mg of SY per kg of diet, group C vitamin E (VE) received the same basal diet supplemented with 40 mg VE per kg of diet and group D fed the basal diet supplemented with both SY and VE. Results reported that semi open type house (1stH) had significantly higher (P<0.01) Air temperature (AT) at morning and afternoon than that in fully shaded type house (2nd H). Daily average AT was lowest value (24.82 °C) in 2nd H than 1stH (30.90 °C). Relative humidity (RH) was significantly higher at morning than afternoon in two housing types. THI values ranged from 61.20 to 64.17and 87.10 to 91.34 in the morning and afternoon, respectively in the two hosing systems. However, the THI average, at morning and the afternoon values in 2nd house was lower (P< 0.05) THI than that of semi open type (1stH). The average values of thermo-regulatory parameters of ewes post-lambing in the morning and afternoon as affected by SE and VE supplemented rations under two different housing systems presented were significantly decreased in SY+VE group followed by SY and VE groups compared to control group in the morning and afternoon in two different housing types. Present data showed significantly (P<0.01) higher in most of hematological parameters (Hgb, RBCs, HCT, PLT, WBCs and differential leucocyte count) under the conditions of subsistence in the 2nd H compared with 1st H. antioxidant enzymes levels showed higher values in SY+VE group compared with the level observed another groups specially control group. Treated ewes by both SY and VE reached to first estrus post-lambing at earlier time and recorded heavier body weight and shorter estrus duration than the other ewes in first and second house. There was significant (P<0.01) increased in mean serum P_4 concentration in all treated groups compared with control group at all time under two hosing systems, indicating the presence of functional corpus luteum in some of the animals. Also, that administration of SY plus VE gave significantly (P<0.01) higher P_4 and E_2 concentrations at day 8, 12, 16, 20 and 24 post-lambing. It could be concluded that SY and/or VE supplemented rations can improve physiological responses post-lambing of ewes under different housing systems.

***Keywords**: selenium yeast, vitamin E, housing systems, reproductive performance, Ossimi ewes*

INTRODUCTION

Vitamins and minerals play an important role in the reproductive and productive performance of ruminant. Selenium and Vitamin E as antioxidants have delay or inhibit oxidative injury to cellular molecule (Gutteridge, and Halliwell, 1994). They are main nutrients that complementary biological roles as antioxidants to reduce cellular injury caused by endogenous peroxides (Kolb *et al.,* 1997). Selenium (SE) has a biological role concerning vitamin E. SE is main component of glutathione peroxides, an enzyme concerned in detoxifation of lipid peroxidation and hydrogen peroxide. Furthermore, SE is a component of selenoproteins and is concerned in immune function in animals' nutrition (Meschy, 2000).

Supplementation of SE improves lambs growth rate and reproductive performance in ewes (Ibrahim, 2017). The requirement of vitamin E may be determine as the amount required preventing peroxidation in the cellular membrane which is most capable to peroxidation (Koyuncu and Yerlikaya, 2007). Vitamin E prevents oxidative damage to sensitive membrane lipids by suppressing hydro peroxide formation (Chow, 2001) and protects cellular membranes thus maintaining membrane integrity and reducing oxidative stress (Hogan *et al.*, 1993).

Housing and management practices can be a source of stress for sheep and domestic animals. Climatic conditions have direct and indirect effects on production and reproduction of livestock. The high environmental temperature and lack of feed may restrict sexual activity during some months of the year in the tropics (El-Sayed, 2003 and Abozed, 2014).

Housing is made to modify the stressful environment to allow the animals to express their genetic potential levels of production. Shading may be a good avenue to avoid the impacts of the natural heat stress particularly solar radiation on animals through providing protection. In this respect, the more efficient shading type is that modifies the surrounding temperature zone, and thus permits best thermoregulatory and productive condition (Azamel, 1984).

Marai *et al.* (2006) reported that the common sheep-breeding season in Egypt is at May–June, during which the climate is hot with rapid and sudden fluctuations, as these months are at the end of spring and the beginning of the summer season. During breeding season in Upper Egypt temperature rises, this difficult weather effect on reducing the productive and reproductive performance of sheep. This condition let us to care of searching about the proper housing system.

The aim of the present study was to evaluate the effect of selenium yeast and / or vitamin E supplementation under two different housing systems on some physiological responses of ewes post-lambing.

MATERIALS AND METHODS

The present study was carried out at Faculty of Agriculture Experimental Station, Minia University, with partnership of Animal Production Research Institute (APRI), Ministry of Agriculture, Egypt, throughout the period from May until October 2016.

This study was carried out to investigate the effect of selenium yeast and/or vitamin E supplemented rations under two different housing types on reproductive performance of ewes post-lambing.

Housing system

Two housing types were used in current study:

1- First type was semi open (20.0 m length × 5.0 m width) house with concrete floor and roofed at 4 m height with west-east direction and divided into four pens partially sheltered at a stocking rate of one head / 1.5-2 m^2.
2- Second type was fully shaded (20.0 m length × 5.0 m width) house roofed with single asbestos sheets at 4 m height and was topped with rice straw bales and natural earthen ground with north-south direction and divided into four pens partially sheltered at a stocking rate of one head / 1.5-2 m^2

Animals and experimental groups

Eighty pregnant Ossimi ewes averaged 40.38±0.93 and 39.49±1.12kg live body weight in the first and second housing type, 3-5 years old and had 2-3 parities were divided after thirty days pre-lambing, into two equal groups (40 ewes each). Each group was settled in one of the housing type and randomly divided into four subgroups (ten ewes per each); group A was kept as a control and was fed the basal diet consist of roughage (rice straw) and concentrate mixture, group B selenium yeast (SY) was fed the basal diet supplemented with 0.3 mg of SY per kg of diet, group C vitamin E (VE) received the same basal diet supplemented with 40 mg VE per kg of diet (Vitamin E 400mg, Parco Pharmaceuticals company) and group D fed the basal diet supplemented with both SY and VE. The calculated concentrations of vitamin E and selenium in the concentrate mixture fed were 13.09 and 0.22 mg/kg DM, respectively. The NRC (2007) requirements for sheep of vitamin E and selenium are between 20 - 25 IU/kg DM and 0.20- 0.30 ppm, respectively.

Animals fed control ration [60% concentrate feed mixture (CFM) and 40% rice straw (RS)], diets offered at 9 am and 4 pm daily. Composite of feedstuff samples analyzed according to the methods of AOAC (1995). All animals weighed biweekly. Fresh water and blocks of mineral salts were available all times of the experiment. The compositions of feed stuffs and the tested ration are presented in Table (1).

Table (1): Chemical composition of concentrate feed mixture, rice straw and the tested ration fed to Ossimi ewes on DM basis.

Items	Chemical composition (%), on DM basis						
	DM	OM	CP	EE	CF	NFE	Ash
CFM	90.64	91.72	16.20	4.53	15.82	55.17	8.28
RS	91.13	85.55	3.41	1.20	38.33	42.61	14.45
CR	90.84	89.25	11.08	3.20	24.82	50.15	10.75

CFM, concentrate feed mixture used in formulating the experimental rations contained 24 % Cotton seed meal; 40% Wheat bran; 30% Yellow Corn 1.5% Lime stone; 1 % Sodium chloride, 0.5% vitamins and mineral mixture and 3% Molasses; RS, rice straw; CR, control ration.

Thermo-regulatory parameters:

All measurements were recorded at biweekly interval for mature ewes at 6:00 to 8:00 h and at 12:00 to 14:00 h. Ambient temperature (AT, °C) and relative humidity (RH, %) were recorded simultaneously while measuring the physiological responses. The Temperature Humidity Index (THI) was calculated from the AT and RH according to Hahn *et al.* (2003):

THI = ((AT*1.8) +32)-((0.55*(RH/100)))*(((AT*1.8) +32)-58).

Respiration rate (RR) was measured by counting the flank movements for one minute. Rectal temperature (RT, °C) and Skin temperatures (ST, °C) were measured in centigrade units by using a clinical thermometer. Pulse rate (PP) was measured by finding the ewe's artery below and slightly inside the jaw count the number of heartbeats in one minute.

Estrus detection

Seven days post-lambing, estrus activity was observed and detected for all ewes twice daily (8:00 am and 4:00 pm) using teaser rams. Rams were interchanged among the experimental ewes. Ewes receptive to rams and stood for mounting were considered in estrus (Sbadenov, 1985). Also, individual blood samples were obtained from both groups every 4 days for determination of progesterone (P_4) concentrations to detect resumption of ovarian cyclicity (1^{st} estrus post-lambing). Moreover, the corresponding vaginal smears were examined to demonstrate cornification of vaginal epithelium in case of estrous ewes (Ateia, 1985).

Blood sampling

Blood samples were collected biweekly in the morning before feeding via the jugular vein from all ewes using 5ml tubes. 1 ml of the blood was put into a bottle containing ethylene diamine tetracetic acid (EDTA) as an anticoagulant for haematological assay. The remaining 4 ml of the blood sample was put into a sterile vacutainer tube without an anticoagulant for serum hormonal assay. The clear non haemolysed supernatant serum was quickly removed for analysis of some oxidative stress markers. The obtained samples were kept at -20 °C till used.

Hematological studies

The hematological assay was determine by using automatic method (automatic cell counter) Vet hematology analyzer was used (Abacus junior, Radim, Italy) after putting the samples on electric mixer. Each sample had been estimated in duplicate manner (mean of each duplicate was introduced to the statistical analysis).

Antioxidant parameters:

Total antioxidant capacity and Glutathione-S-transferase were determined in serum according to the procedure of Koracevic *et al.* (2001) and Habig *et al.* (1974), respectively, using biosdiagnostic reagent kits.

Hormonal assays

Once the ewe was detected to be in estrus seven days post-lambing, individual blood sample was collected every four days for one cycle (16 days) to assay levels of progesterone (P_4) and estradiol (E_2). Quantitative determination of P_4 and E_2 was carried out using radioimmunoassay kits DSL-USA. Catalog No.3900 (Meizger, 1992) using specific kits supplied by Diagnostic system laboratories. Inc.,Webster, Texas, USA.

Statistical analyses

Data statistically analyzed using the general linear model procedure (SAS, 2002). The differences between treatments tested were according Duncan's Multiple-rang test (Duncan, 1955).

RESULTS AND DISCUSSION

Housing and environmental condition:

Environmental conditions of ewe's houses are summarized in Table (2). Results show that semi open type house shaded with concrete floors with west-east direction (1st H) had significantly higher (P<0.01) Air temperature (AT) at morning and afternoon than that in second type (fully shaded type house roofed with single asbestos sheets and was topped with rice straw bales and natural earthen ground with north-south direction, 2nd H). Daily average AT was lowest value (24.82 °C) in 2nd H than 1st H (30.90 °C).

Table (2): Ambient temperature, relative humidity and temperature-humidity index in different housing types of Ossimi ewes

	Housing types		P. Value
	1st house	2nd house	
Air Temperature (AT, °C)			
Morning	20.60±1.05[a]	17.30±0.18[b]	0.013
Afternoon	37.60±1.03[a]	34.30±0.12[b]	0.010
Average	30.90±1.41[a]	24.82±0.74[b]	0.013
Relative humidity (RH, %)			
Morning	80.60±1.50[a]	68.60±2.27[b]	0.002
Afternoon	36.40±1.15[a]	33.80±0.37[b]	0.047
Average	58.50±1.15[a]	51.20±1.22[b]	0.002
Temperature-humidity index (THI)			
Morning	64.17±0.96[a]	61.20±0.16[b]	0.017
Afternoon	91.34±1.31[a]	87.10±0.21[b]	0.013
Average	75.89±1.110[a]	72.68±0.220[b]	0.023

[a and b] ,means per each row with different superscripts are significantly different (P<0.05).
*THI = ((AT*1.8)+32)-((0.55*(RH/100)))*(((AT*1.8)+32)-58).*

Relative humidity (RH) was significantly higher at morning than afternoon in all housing types. 1st house showed higher (P<0.01) RH (80.60 % & 36.40 %) than 2nd house (68.60 % & 33.80 %) at morning and afternoon, respectively. Average of RH was higher in (1st H) than the other housing type (2nd H).

Temperature humidity index values ranged from 61.20 to 64.17 and 87.10 to 91.34 in the morning and afternoon, respectively in the different hosing systems (Table, 3). However, the THI average, at morning and the afternoon values in 2nd house was lower (P< 0.05) THI than that of semi open type (1st H).

Thermo-regulatory parameters

The average values of skin temperature (ST), rectal temperature (RT), respiration rate (RR) and pulse rate (PR) of ewes post-lambing in the morning and afternoon as affected by SE and VE supplemented rations under two different housing systems are presented in Tables (3&4). The data indicated that all parameters (ST, RT, RR and PR) significantly decreased in SE+VE group followed by SE and VE groups compared to control group in the morning and afternoon in two different housing types (Table, 3). This result is disagreement in finding of El-Shahat and Abdel Monem (2011) who reported that rectal temperature and respiratory rates were not significantly change by selenium and/or vitamin E supplemented ration.

Table (3): Thermo-regulatory parameters of Ossimi ewes as affected by selenium yeast and/or vitamin E supplemented rations under two different housing systems.

Trait	Time	Treatments				P. value
		CR	SY	VE	SY+VE	
1st house						
RT	Mor.	38.53±0.04^{a}	38.33±0.09^{b}	38.05±0.05^{c}	38.00±0.03^{c}	0.001
	Aft.	39.20±0.06^{a}	38.95±0.08^{b}	38.95±0.05^{b}	38.85±0.09^{b}	0.024
	Avg.	38.86±0.04^{a}	38.64±0.03^{b}	38.50±0.03^{c}	38.43±0.04^{c}	0.001
ST	Mor.	36.05±0.10^{a}	35.75±0.10^{b}	35.35±0.09^{c}	35.38±0.05^{c}	0.001
	Aft.	38.18±0.07^{a}	38.05±0.02^{a}	37.23±0.05^{b}	37.28±0.27^{b}	0.001
	Avg.	37.11±0.02^{a}	36.90±0.06^{b}	36.29±0.06^{c}	36.33±0.13^{c}	0.001
RR	Mor.	28.50±0.74^{a}	27.50±0.81^{ab}	27.75±0.86^{ab}	25.50±0.50^{b}	0.042
	Aft.	51.50±1.02^{a}	49.50±0.50^{ab}	49.75±0.66^{ab}	47.50±0.67^{b}	0.013
	Avg.	40.00±0.82^{a}	38.50±0.27^{a}	38.75±0.56^{a}	36.50±0.52^{b}	0.005
PR	Mor.	81.50±3.60^{a}	73.00±1.00^{b}	72.50±1.16^{b}	69.75±0.66^{b}	0.004
	Aft.	117.00±6.74^{a}	110.00±3.69^{ab}	109.50±4.26^{ab}	102.50±1.47^{b}	0.043
	Avg.	99.25±4.96^{a}	91.50±2.20^{ab}	91.00±2.70^{ab}	86.13±0.64^{b}	0.053
2nd house						
RT	Mor.	38.13±0.04^{a}	38.00±0.08^{a}	38.05±0.05^{ab}	37.88±0.04^{b}	0.037
	Aft.	38.85±0.05^{a}	38.58±0.04^{b}	38.43±0.04^{c}	38.35±0.05^{c}	0.001
	Avg.	38.49±0.04^{a}	38.29±0.04^{b}	38.24±0.03^{b}	38.11±0.04^{c}	0.001
ST	Mor.	35.78±0.08^{a}	35.00±0.12^{b}	34.85±0.07^{bc}	344.68±0.04^{c}	0.001
	Aft.	37.73±0.08^{a}	37.83±0.16^{a}	37.15±0.10^{b}	36.95±0.05^{b}	0.001
	Avg.	36.75±0.06^{a}	36.41±0.08^{b}	36.00±0.08^{c}	35.81±0.02^{d}	0.001
RR	Mor.	29.00±0.71^{a}	26.50±0.74^{b}	26.00±0.32^{b}	24.00±0.55^{c}	0.001
	Aft.	50.00±0.32^{a}	48.25±0.66^{ab}	46.75±0.37^{ab}	45.50±2.58^{b}	0.046
	Avg.	39.50±0.47^{a}	37.38±0.46^{ab}	36.38±0.29^{bc}	34.75±1.33^{c}	0.003
PR	Mor.	64.00±0.32^{a}	62.75±0.73^{ab}	60.75±1.07^{b}	49.75±0.66^{c}	0.001
	Aft.	90.75±0.86^{a}	89.00±1.26^{ab}	87.25±2.06^{ab}	84.50±1.28^{b}	0.042
	Avg.	77.38±0.51^{a}	75.88±0.66^{ab}	74.00±1.23^{b}	67.13±0.87^{c}	0.001

$^{a,b\ and\ c}$,means per each row with different superscripts are significantly different (P<0.05).

CR, control ration; SY, selenium yeast; VE, vitamin E; RT, Rectal temperature (°C); ST, Skin temperature (°C); RR, Respiration rate (breath / min.); PR, Pulse rate (pulse / min.); Mor. , Morning; Aft., Afternoon; Avg. , Average

Thermo-regulatory parameters values (TRPV) of ewes were significantly lower (P<0.01) in 2nd house than those in 1st house at morning, afternoon and daily average (Table, 4).

In different housing systems and different treatments, TRPV at morning was significantly lower (P<0.01) than that at afternoon (Tables, 3&4). Similar results were obtained by Abozed (2009 and 2014) who found that during the day, rectal temperature, skin temperature and respiration rate of ewes were higher at afternoon than at morning with increasing ambient temperatures.

In the present work, the increasing in TRPV of ewes in semi open house (1st H) may be due to the increasing of AT and THI compared with that in second house (Table, 3). Shalaby *et al.* (1996) found that hot condition resulted in an increase in core body temperature. Also, the increase in TRPV of ewes at afternoon may be due to the elevation of AT and THI at afternoon (Tables, 3), metabolic rate (Piccione *et al.*, 2002 and Piccione and Caola, 2003) and heat of digestion (Robinson, 2002). Johnson (1971) reported that raising ambient temperature from 20 °C to 45 °C resulted in an increase in rectal temperature by 1.4

°C in Merino breeds. Also, *El*-Sherbiny *et al.* (1983) found that increasing ambient temperature from 20 to 40 °C increased rectal temperature of goats by 1.5 °C. Among adaptive response, RR was the most sensitive parameter that reflected faster and greater response to the environmental condition. Therefore, when animals were exposed to rising AT the first observed response was the increase in RR (Ashour *et al.,* 1998).

Such decreasing in RR of ewes in 2nd house compared with that in other house may be due to the increase of THI, which caused stimulation of heat sensitive receptors in the skin, which give signal to the hypothalamus. Hypothalamus sends this signal to the respiratory centers in the medulla oblongata and stimulates them to produce rapid shallow panting. Also, due to that there are highly significantly positive correlation coefficients (0.41 and 0.57) between RR and RT and ST (Abozed, 2014). Similarly, Naqvi *et al.* (2004) showed a significant (P<0.05) decrease in the RR of ewes maintained in shading than those exposed to thermal stress (40 °C) in hot chamber at 14:00 h. (95.1 *vs.* 126.5 Resp./min.). Also, Abozed (2009) showed there is highly and significantly positive correlation coefficient of ST (0.53, 0.57 and 0.93) with each of RT, RR, AT, respectively. Sayah (2005) found the same trend.

Table (4): Effect of selenium yeast and/or vitamin E supplemented rations or housing types on thermo-regulatory parameters of Ossimi ewes.

Factors	Thermo-regulatory parameters											
	RT			ST			RR			PR		
	Mor.	Aft.	Avg.	Mor.	Aft.	Avg.	Mor.	Aft.	Avg.	Mor.	Aft.	Avg.
Housing type												
1st	38.23^{a}	38.99^{a}	38.61^{a}	35.63^{a}	37.68^{a}	36.66^{a}	27.31^{a}	49.56^{a}	38.44^{a}	74.12^{a}	109.75^{a}	91.97^{a}
2nd	38.01^{b}	38.55^{b}	38.28^{b}	35.08^{b}	37.41^{b}	36.24^{b}	26.38^{b}	47.63^{b}	37.00^{b}	59.31^{b}	87.88^{b}	73.60^{b}
±SE	0.03	0.03	0.02	0.04	0.06	0.04	0.34	0.54	0.34	0.75	1.65	1.12
P. value	0.001	0.001	0.001	0.001	0.004	0.001	0.048	0.017	0.005	0.001	0.001	0.001
Treatments												
CR	38.33^{a}	39.03^{a}	38.68^{a}	35.91^{a}	37.95^{a}	36.93^{a}	28.75^{a}	50.75^{a}	39.75^{a}	72.75^{a}	103.88^{a}	88.31^{a}
SY	38.16^{b}	38.76^{b}	38.46^{b}	35.38^{b}	37.94^{a}	36.66^{b}	27.00^{b}	48.88^{ab}	37.94^{b}	67.88^{b}	99.50^{ab}	83.69^{b}
VE	38.05^{c}	38.69^{bc}	38.37^{c}	35.10^{c}	37.19^{b}	36.14^{c}	26.88^{b}	48.25^{bc}	37.56^{b}	66.63^{b}	98.38^{ab}	82.50^{b}
SY+VE	37.94^{c}	38.60^{c}	38.27^{d}	35.03^{c}	37.11^{b}	36.07^{c}	24.75^{c}	46.50^{c}	35.63^{c}	59.75^{c}	93.50^{b}	76.63^{c}
±SE	0.04	0.04	0.03	0.06	0.09	0.05	0.48	0.77	0.48	1.06	2.34	1.58
P. value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.005	0.001	0.001	0.032	0.001

$^{a,b,c\ and\ d}$, means per each column with different superscripts are significantly different (P<0.05).

RT, Rectal temperature (°C); ST, Skin temperature (°C); RR, Respiration rate (breath / min.); PR, Pulse rate (pulse / min.); Mor. , Morning; Aft., Afternoon; Avg., Average

Blood picture results as affected by SE and/or VE supplemented rations under two different housing systems are shown in Tables 5 and 6. Data showed no significant (P>0.05) changes for all hematological parameters and differential leucocyte count among experimental groups in different housing systems. The presented results are in agreement with similar observations reported by Bednarek *et al.* (1996) and Mohri *et al.* (2011). They found that the differences for erythrocyte count, hemoglobin concentration, and hematocrit were not significant in parenterally VE and SE supplemented calves. In another study, WBC counts were significantly higher in VE and SE injected groups of rats than in the control, but the erythrocyte count (RBCs) and the hemoglobin (Hgb), packed cell volume (PCV), mean red cell volume (MCV), mean red cell hemoglobin (MCH), and MCH concentration (MCHC) values were apparently not influenced by the injection of VE and SE (Cay and Naziroglu, 1999). In contrast to the presented results, Sado *et al.* (2013) showed dietary vitamin E levels influenced (P<0.05) hematological parameters and blood biochemistry. SE deficiency also contributes to a decrease in bactericidal properties of neutrophils and to the inhibition of lymphocyte proliferation (Cao *et al.*, 1992).

Table (5): Blood picture of Ossimi ewes as affected by selenium yeast and/or vitamin E supplemented rations under two different housing systems.

Item	Treatments				P. value
	CR	SY	VE	SY+VE	
House 1					
Hgb (g/dl)	10.48±0.20	10.40±0.19	10.93±0.74	10.48±0.25	0.800
RBCs (10^6/ul)	3.70±0.08	3.58±0.06	3.68±0.31	3.53±0.09	0.867
HCT (%)	32.50±0.54	31.80±0.52	34.00±2.16	32.33±0.85	0.628
MCV (fl)	87.98±0.79	89.08±1.48	93.78±2.20	91.50±0.22	0.051
MCH (pg)	28.33±0.27^{b}	29.10±0.35^{ab}	30.10±0.61^{a}	29.58±0.05^{a}	0.034
MCHC (g/dl)	32.20±0.11	32.68±0.19	32.10±0.18	32.35±0.06	0.740
PLT (10^3/ul)	241.68±31.94	241.68±31.94	190.80±3.18	293.00±44.91	0.217
WBCs (10^3/ul)	6.95±0.13	7.33±0.12	7.50±0.21	7.58±0.21	0.099
Differential leucocyte count					
Neutrophil (%)	25.58±0.49	25.58±0.49	23.83±0.96	23.20±0.69	0.065
Lymphocyte (%)	66.53±1.05	66.53±1.05	68.70±1.35	69.30±1.10	0.240
Monocyte (%)	5.53±0.15^{b}	5.53±0.15^{b}	5.60±0.04^{b}	6.58±0.43^{a}	0.024
Eosinophil (%)	0.30±0.07	0.30±0.07	0.20±0.04	0.10±0.01	0.065
Basophil (%)	2.08±0.38	2.08±0.38	1.70±0.33	0.88±0.03	0.060
House 2					
Hgb (g/dl)	11.58±0.25	10.68±0.25	11.80±0.46	11.48±0.49	0.227
RBCs (10^6/ul)	3.93±0.10	3.68±0.06	4.08±0.17	3.93±0.17	0.243
HCT (%)	35.80±0.78	33.10±0.75	36.50±1.39	35.60±1.54	0.239
MCV (fl)	90.88±0.34	90.40±0.19	89.90±0.53	90.35±0.05	0.276
MCH (pg)	29.38±0.13	29.13±0.09	29.03±0.09	29.13±0.03	0.089
MCHC (g/dl)	32.33±0.03	32.23±0.03	32.30±0.11	32.23±0.03	0.525
PLT (10^3/ul)	188.68±17.99	179.33±19.48	171.33±19.48	193.38±3.32	0.668
WBCs (10^3/ul)	4.88±0.20	4.60±0.32	4.85±0.06	4.90±0.11	0.703
Differential leucocyte count					
Neutrophil (%)	27.28±0.27^{a}	27.40±0.35^{a}	25.58±0.06^{b}	26.23±0.10^{b}	0.006
Lymphocyte (%)	63.58±1.57	64.00±1.27	66.53±1.05	65.18±1.10	0.303
Monocyte (%)	7.23±1.09	7.20±1.06	5.53±0.15	5.73±0.03	0.276
Eosinophil (%)	0.33±0.05	0.30±0.07	0.30±0.07	0.33±0.06	0.984
Basophil (%)	1.60±0.33^{bc}	1.10±0.18^{c}	2.08±0.38^{ab}	2.58±0.05^{a}	0.012

$^{a \text{ and } b}$, means per each row with different superscripts are significantly different (P<0.05).

CR, control ration; SY, selenium yeast; VE, vitamin E ; Hgb, Haemoglobin; RBC, Erythrocyte count; HCT, Hematocrit; MCV, Mean red cell volume; MCH, Mean red cell Hgb; MCHC, Mean red cell Hgb count; PLT, Platelet count; WBC, Total leucocyte count; Neu., Neutrophil (%); Lym., Lymphocyte (%); Mon., Monocyte (%); Eos., Eosinophil (%); Bas., Basophil (%).

The results in Table (6) indicated that there were significantly (P<0.01) higher in most of hematological parameters (Hgb, RBCs, HCT, PLT, WBCs and differential leucocyte count) under the conditions of subsistence in the second housing system compared with the first housing system. This is in agreement with the results of Abozed (2014). There is highly and significantly negative correlation coefficient between Hb concentration and ambient temperature (AT) was -0.64 reported by Abozed (2014) and -0.53 by Sayah (2005).

These results can be attributed to the hemodilution effect of water due to the consumption of large amount of water by animals to alleviate heat load, consequently an increase in plasma and blood volumes changes in cells resulting in a reduction in the concentration of circulating erythrocyte counts and subsequently reduction in Hb concentration and PCV, % values. This is in agreement with the results of Abozed (2009 & 2014). The results revealed that the high AT and THI affected the hematological responses. This result is in agreement with Sayah (2005) and Abozed (2009 & 2014). Kamal *et al.* (1984) clarified that under hot climate condition RR increases, which may lead to an increase in oxygen transportation for heat stressed animals, accompanied with reduction in plasma protein and some trace elements such as cobalt, iron and copper which are important metals for hemoglobin synthesis, which reduce the hemoglobin ratio.

Table (6): Effect of selenium yeast and/or vitamin E supplemented rations or housing types on blood picture of Ossimi ewes.

Factor	Hematological parameters												
	Hgb	RBC	HCT	MCV	MCH	MCHC	PLT	WBC	Neu	Lym.	Mon.	Eos.	Bas.
HT													
1st	10.57[b]	3.62[b]	32.66[b]	90.58	29.28	32.33	241.79[b]	7.34[a]	24.54[b]	67.76[a]	5.81	0.23[b]	1.66
2nd	11.38[a]	3.90[a]	35.25[a]	90.38	29.16	32.27	183.09[a]	4.81[b]	26.62[a]	64.82[b]	6.42	0.31[a]	1.83
±SE	0.20	0.06	0.60	0.51	0.14	0.06	12.26	0.09	0.27	0.57	0.28	0.03	0.15
P. value	0.008	0.015	0.005	0.782	0.566	0.433	0.002	0.001	0.001	0.001	0.139	0.047	0.456
Treatment													
CR	11.03	3.81	34.15	89.43	28.85	32.26	215.18	5.91	26.43[a]	65.05	6.38	0.31	1.84
SY	10.54	3.63	32.45	89.74	29.11	32.45	210.50	5.96	26.49[a]	65.26	6.36	0.30	1.59
VE	11.36	3.88	35.25	91.84	29.56	32.20	180.90	6.18	24.70[b]	67.60	5.56	0.25	1.89
SY+VE	10.98	3.73	33.96	90.93	29.35	32.29	243.19	6.24	24.71[b]	67.20	6.15	0.21	1.73
±SE	0.28	0.11	0.85	0.71	0.19	0.08	17.34	0.13	0.38	0.81	0.40	0.04	0.21
P. value	0.253	0.395	0.164	0.090	0.082	0.166	0.119	0.257	0.002	0.069	0.453	0.323	0.742

[a and b], means per each column with different superscripts are significantly differ (P<0.05).

CR, control ration; SY, selenium yeast; VE, vitamin E; HT, house type; Hgb, Haemoglobin; RBC, Erythrocyte count; HCT, Hematocrit; MCV, Mean red cell volume; MCH, Mean red cell Hgb; MCHC, Mean red cell Hgb count; PLT, Platelet count; WBC, Total leucocyte count; Neu., Neutrophil (%); Lym., Lymphocyte (%); Mon., Monocyte (%); Eos., Eosinophil (%); Bas., Basophil (%).

Tables (7 & 8) showed the effect of SY and VE supplemented rations on total antioxidant capacity (TAC) and glutathione-S-transferase (GST) under two different housing systems. Serum TAC and GST levels showed higher values in SY+VE group compared with the level observed another the three groups specially control group. Percentages of the improvement in TAC level were 19.85, 55.15 and 104.41% in house 1 compared with 7.04, 54.27 and 63.32% in house 2 of SY, VE and SE+VE groups respectively. While, improvement of GST level were 38.63, 44.35 and 81.02% in house 1 compared with 18.95, 58.78 and 70.02 in house 2 of SY, VE and SE+VE groups respectively (Table, 7). Meanwhile, Table (8) showed there were highly significant (P<0.01) increased in TAC and GST between two housing systems and among treatments. This is in agreement with the results of Liu *et al.* (2016) who reported that pigs an increase of dietary SE and VE mitigated the impacts of heat stress on intestinal barrier integrity, associated with a reduction in oxidative stress by increasing glutathione peroxidase activity and glutathione peroxidase-2 mRNA.

There are a synergistic action between SE and VE. VE supplementation increased antioxidant recycling and improved synergistic antioxidant effect (Ramos *et al.,* 1998; Kirschvink *et al.,* 2007). Antioxidant systems include molecules such as VE and SE-containing enzyme, which act as membrane antioxidants to maintain the integrity of phospholipids against oxidative damage and peroxidation (Di-Mascio *et al.,* 1991). Deficiency of SE in cows also influences the decrease of the level and activity of the most important antioxidants, such as GPX-1, of mRNA and gene expression at the protein level, responsible for antioxidative defense mechanisms, which results in the increased vulnerability of cows to immunosuppression (Colitti and Stefanon 2006). Kumari *et al.* (2013) reported that VE and SE containing glutathione peroxidase are among the principle in vivo chain breaking antioxidants, thus had protective effect. Vitamin E is involved in removal of free radical and prevents their peroxidative effect on unsaturated lipid of membrane and thus help in maintaining integrity of membrane. Chromanol ring of tocopherols donates its phenolic hydrogen to reduce the free radical and is itself oxidised to the quinone form. Thus, the results suggest that antioxidant supplementation may improve the barrier function of the intestine even in conditions of mild threat. Pig feed is normally supplemented with both Se and VE because these antioxidants work effectively together. Whether one or other might contribute more in conditions of heat stress is not known.

Table (7): Total antioxidant capacity and glutathione-S-transferase levels of Ossimi ewes post-lambing as affected by selenium yeast and/or vitamin E supplemented rations under two different housing systems.

Item	Treatments				P. value
	CR	SY	VE	SY+VE	
House, 1					
TAC (g/dl)	1.36±0.07^{c}	1.63±0.12^{c}	2.11±0.11^{b}	2.78±0.16^{a}	0.001
GST (U/l)	77.92±15.91^{c}	108.02±4.14^{b}	112.48±4.40^{b}	141.05±7.45^{a}	0.001
House, 2					
TAC (g/dl)	1.99±0.24^{b}	2.13±0.16^{b}	3.07±0.10^{a}	3.25±0.13^{a}	0.001
GST (U/l)	93.11±10.61^{b}	110.75±9.10^{b}	147.84±6.31^{a}	158.31±1.86^{a}	0.001

$^{a, b \text{ and } c}$, means per each row with different superscripts are significantly different (P<0.05).

TAC= Total antioxidant capacity; GST= glutathione-S-transferase.

Table (8): Effect of selenium yeast and/or vitamin E supplemented rations or housing types on antioxidant parameters of Ossimi ewes.

Factor	Antioxidant parameters	
	TAC (g/dl)	GST (U/l)
Housing type		
1st	1.97^{b}	109.87^{b}
2nd	2.61^{a}	127.50^{a}
±SE	0.07	4.27
P. value	0.001	0.005
Treatments		
CR	1.67^{c}	85.52^{d}
SY	1.88^{c}	109.39^{c}
VE	2.59^{b}	130.16^{b}
SY+VE	3.02^{a}	149.68^{a}
±SE	0.10	6.04
P. value	0.001	0..001

$^{a, b, c \text{ and } d}$, Means within each column with different superscripts are significantly different (P<0.05).
TAC= Total antioxidant capacity; GST= glutathione-S-transferase.

Data of Ossimi ewe reproductive performance post-lambing as affected by SE and VE supplemented rations in different housing types are presented in Tables (9&10). Tables (9&10) indicated that untreated ewes by both VE and SE reached to first estrus post-lambing at earlier time and recorded heavier body weight than the other ewes in first and second house. Also, mean of estrus duration of ewes treated by both VE and SE at first estrus recorded shorter time in first and second house than untreated but the differences were not significant (P>0.05). While, significant (P<0.05) increases were noticed in the age at

first estrus, mean body weight and estrus duration post-lambing among treatments but here were no significant (P>0.05) differences between housing types. This result are agreement with El-Shahat and Abdel Monem (2011) who reported that SE+VE supplemented ewes had a significantly (P<0.01) decreased the mean time interval from supplementation to 1st estrus as compared to control group. In buffaloes, vitamin E-selenium significantly improved the reproductive performance in respect of uterine involution period, calving to estrus interval, service period and services per conception as compared to control (Qureshi *et al.,* 1997). Many investigators explain the role of VE and SE on reproduction and their requirement in the reproductive tissues (Smith *et al.,* 2000). Antioxidants (Tables, 7&8) stimulate the process of steroid genesis and stimulate the anterior pituitary gland to release GnRH hormones and initiation of folliculogenesis in the ovaries. Thus VE and SE could improve uterine health through enhancing neutrophils function, support uterine function and stimulate ovarian activity (Politis *et al.,* 1996; Meshreky and Metry 2000). Free radicals cause damage to cellular membranes, thereby creating a need for more antioxidants to maintain cell integrity. Vitamin E is an integral component of lipid membranes. The use of brown adipose tissue in the animal would suggest a need for ample amounts of antioxidants to reduce the amount of free radical buildup. SE supplementation enhances the level of SE and may indirectly improve animal performance (Sobiech *et al.,* 2002) and strengthening the immunity of the animal (Milad *et al.,* 2001).

Table (9): Estrus activity post-lambing of Ossimi ewes as affected by selenium yeast and/or vitamin E supplemented rations under two different housing systems.

Item	Treatments				P. value
	CR	SY	VE	SY+VE	
House, 1					
Time at 1st estrus, day	54.00±4.31^{a}	52.50±2.65^{ab}	51.50±1.91^{ab}	43.50±2.70^{b}	0.040
Body weight at 1st estrus	38.10±0.81^{b}	38.10±0.73^{b}	39.10±0.28^{b}	42.40±0.88^{a}	0.001
Estrus duration, hour	22.80±3.41	18.00±1.81	18.00±1.81	16.20±1.63	0.220
House, 2					
Time at 1st estrus, day	54.00±5.79	51.50±2.70	49.50±3.19	44.50±3.33	0.383
Body weight at 1st estrus	38.89±0.97^{b}	39.10±0.89^{b}	39.20±0.61^{b}	41.64±0.73^{a}	0.040
Estrus duration, hour	21.60±2.01^{a}	19.20±1.77^{ab}	18.00±1.81^{ab}	15.60±1.66^{b}	0.147

$^{a \text{ and } b}$, means per each row with different superscripts are significantly different (P<0.05).

On the other hand, these differences could be due to increasing milk production and prolactin concentration (Lopez *et al.,* 2004; Allison *et al.,* 2009; Mohamed, 2010). Who reported that there were antagonistic relationship between milk production, prolactin concentration and estrous behavior of lactating sheep and dairy cows. Median eminence lesions or pituitary stalk section resulted increase prolactin secretion in cattle and sheep (Lincoln and Clarke, 1994; Anderson *et al.,* 1999).

In addition, Harrison *et al.,* (1990) reported higher yielding cows showing weaker signs of estrus than lower yielding. In contrast, Van-Eerdenburg *et al.,* (2002) reported no relationship between milk yield and estrous behavior score from Holstein cows when a visual scoring system for estrous characterization. Variation in the results from previous studies that analyzed the relationship between level of milk production and estrous behavior of lactating cows may be related to sample size, differences in the level of milk production and the period when milk production data were collected and the system used to characterize estrus. Another drawback of these previous studies is the timing of milk production data collection in relation to the expression of estrus. These studies analyzed either total milk yield or milk production during long periods (70-120 days) in relation to estrous behavior (Harrison *et al.,* 1990 and Van-Eerdenburg *et al.,* 2002). However, to precisely evaluate the relationship between milk production and estrous behavior, milk production near the time of estrous expression should be used as an indicator of the level of production rather than total or predicted milk yield. Finally, Lopez *et al.,* (2004) supported our general hypothesis that incidence of estrus post-lamping is reduced by increased level of milk production. It appears that estradiol concentrations at estrus and duration and intensity of estrus are inversely affected by the level of milk production.

Table (10): Effect of selenium yeast and/or vitamin E supplemented rations or housing types on estrus activity post-lambing of Ossimi ewes.

Factors	Traits		
	Time at 1st estrus, day	Body weight at 1st estrus	Estrus duration, hour
Housing type			
1st	50.38	39.43	18.75
2nd	49.87	39.71	18.60
±SE	1.76	0.38	1.03
P. value	0.841	0.606	0.918
Treatments			
CR	54.00[a]	38.49[b]	22.20[a]
SY	52.00[a]	38.60[b]	18.60[ab]
VE	50.50[ab]	39.15[b]	18.00[ab]
SY+VE	44.00[b]	42.02[a]	15.90[b]
±SE	2.48	0.54	1.46
P. value	0.034	0.0001	0.027

[a and b], means per each column with different superscripts are significantly different (P<0.05).

The post-lambing serum P_4 and E_2 concentrations of the SY and/or VE supplemented between 8 d and 24 d under two different housing systems are presented in Tables (11&12). The serum P_4 concentration at day 8 post-lambing ranged between 0.63 to 1.04 ng/ml, i.e. less than 1.5 ng/ml in all the experimental animals, which confirmed the anestrous state of ewes However, there was significant (P<0.01) increased in mean serum P_4 concentration in all treated groups compared with control group at all time under tow hosing systems, indicating the presence of functional corpus luteum in some of the animals. Our findings were in agreement with the observations of Ganie *et al.* (2014). Meanwhile, E_2 levels were significantly (P<0.01) different at days 8, 12, 16, 20 and 24 of SY and/or VE groups compared with control group with two different housing systems.

Present results showed that administration of SY plus VE gave significantly (P<0.01) higher P_4 and E_2 concentrations at day 8, 12, 16, 20 and 24 post-lambing (0.98, 1.05, 4.35, 4.60 and 0.97 ng/ml and 39.22, 5.71, 3.55, 3.86 and 36.31 pg/ml, respectively) as compared to that observed in the control group (0.70, 0.77, 4.07, 4.32 and 0.69 ng/ml and 35.58, 5.08, 2.92, 3.23 and 34.53 pg/ml, respectively). Similarly, Subsistence system in the house 2 also gave significantly(P<0.01) higher concentration of P_4 and E_2 at day 8, 12, 16, 20 and 24 post-lambing (0.90, 0.79, 4.32, 4.56 and 0.86 ng/ml and 39.09, 5.42, 3.17, 3.48 and 35.98 pg/ml, respectively) as compared to the other housing system (0.77,0.85, 4.09, 4.36 and 0.80 ng/ml and 36.01, 5.14, 3.08, 3.38 and 35.02 pg/ml, respectively) (Table 12).

The difference between the groups in E_2 concentration may be related to the different stages of the estrus cycle in experimental animals. The E_2 profiles recorded in this study were characterized by two peaks. Such an increase in the E_2 concentration during the early luteal phase has been reported by Hashim *et al.*, (2013). In addition to the pre-ovulatory peak in E_2 concentration at the onset of estrus, a second peak of lower magnitude occurred 4-6 days later during the bovine and ovine ovulatory cycle (Souza *et al.*, 1998). E_2 is considered as a good marker of follicular quality (Campbell *et al.*, 1995). The number of large follicles and E_2 concentrations were positively correlated during the estrus cycle.

Harrison *et al.* (1984a) reported that effective reduction of incidence of metritis and cystic ovaries may be reached by pre-partum selenium (SE) injections during the post-partum period, in dry cows. It is known that selenium is required by ewes, since it is accumulated preferentially by the placentome, ovary, pituitary and adrenal glands.

Kamada (2017) reported that the highest average level of postpartum plasma P_4 in cows treated by SE suggested corpus luteum (CL) function developed earlier after calving in SE supplemented cows pre- and

post-partum than in control. Selenium addition realized early recovery of post-partum ovary function and more promoted the formation of functional CL. Selenium has important role to improve the reproductive performance of domestic animals (Harrison *et al.,* 1984c).

Table (11): Progesterone and estradiol levels of Ossimi ewes post-lambing as affected by selenium yeast and/or vitamin E supplemented rations under two different housing systems.

Item	Days post-lambing	Treatments				P. value
		CR	SY	VE	SY+VE	
House, 1						
P_4 (ng/ml)	8	0.63±0.03^{c}	0.73±0.03^{b}	0.81±0.03^{b}	0.91±0.03^{a}	0.001
	12	0.71±0.01^{d}	0.81±0.01^{c}	0.89±0.01^{b}	0.99±0.01^{a}	0.001
	16	3.95±0.03^{c}	4.05±0.03^{b}	4.13±0.03^{b}	4.23±0.03^{a}	0.001
	20	4.22±0.02^{d}	4.32±0.02^{c}	4.40±0.02^{b}	4.50±0.02^{a}	0.001
	24	0.66±0.01^{d}	0.76±0.01^{c}	0.84±0.01^{b}	0.94±0.01^{a}	0.001
E_2 (Pg/ml)	8	33.61±0.55^{c}	35.61±0.55^{b}	36.91±0.55^{b}	37.91±0.55^{a}	0.001
	12	4.94±0.03^{c}	4.99±0.03^{bc}	5.07±0.03^{b}	5.57±003^{a}	0.001
	16	2.88±0.04^{c}	2.93±0.04^{bc}	3.01±0.04^{b}	3.51±0.04^{a}	0.001
	20	3.18±0.13^{b}	3.23±0.13^{b}	3.31±013^{b}	3.81±0.13^{a}	0.016
	24	34.05±0.06^{c}	35.05±0.06^{b}	35.13±0.06^{b}	35.83±0.06^{a}	0.001
House, 2						
P_4 (ng/ml)	8	0.76±0.01^{d}	0.86±0.01^{c}	0.94±0.01^{b}	1.04±0.01^{a}	0.001
	12	0.83±0.01^{d}	0.93±0.01^{c}	1.01±0.01^{b}	1.11±0.01^{a}	0.001
	16	4.18±0.02^{d}	4.28±0.02^{c}	4.36±0.02^{b}	4.46±0.02^{a}	0.001
	20	4.42±0.4^{c}	4.52±0.04^{bc}	4.60±0.04^{ab}	4.70±0.04^{a}	0.012
	24	0.72±0.01^{d}	0.82±0.01^{c}	0.90±0.01^{b}	1.00±0.01^{a}	0.001
E_2 (Pg/ml)	8	37.56±0.16^{d}	38.76±0.16^{c}	39.91±0.16^{b}	40.53±0.16^{a}	0.001
	12	5.22±0.05^{b}	5.27±0.05^{b}	5.35±0.05^{b}	5.85±0.05^{a}	0.001
	16	2.97±0.02^{c}	3.02±0.02^{c}	3.10±0.02^{b}	3.60±0.02^{a}	0.001
	20	3.28±0.04^{b}	3.33±0.04^{b}	3.41±0.04^{b}	3.91±0.04^{a}	0.001
	24	35.01±0.05^{c}	36.01±0.05^{b}	36.09±0.05^{b}	36.79±0.05^{a}	0.001

$^{a, b, c \text{ and } d}$, means per each row with different superscripts are significantly different (P<0.05).

Table (12): Effect of selenium yeast and/or vitamin E supplemented rations or housing types on progesterone and estradiol levels of Ossimi ewes post-lambing.

Factor	P_4 (ng/ml)					E_2 (Pg/ml)				
	8 d	12 d	16 d	20 d	24 d	8 d	12 d	16 d	20 d	24 d
Housing type										
1st	0.77^{b}	0.85^{b}	4.09^{b}	4.36^{b}	0.80^{b}	36.01^{b}	5.14^{b}	3.08^{b}	3.38	35.02^{b}
2nd	0.90^{a}	0.97^{a}	4.32^{a}	4.56^{a}	0.86^{a}	39.09^{a}	5.42^{a}	3.17^{a}	3.48	35.98^{a}
±SE	0.01	0.01	0.01	0.02	0.01	0.20	0.02	0.02	0.05	0.03
P. value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.148	0.001
Treatments										
CR	0.70^{d}	0.77^{d}	4.07^{d}	4.32^{d}	0.69^{d}	35.58^{d}	5.08^{c}	2.92^{c}	3.23^{b}	34.53^{c}
SY	0.80^{c}	0.87^{c}	4.17^{c}	4.42^{c}	0.79^{c}	37.18^{c}	5.13^{bc}	2.97^{c}	3.28^{b}	35.53^{b}
VE	0.88^{b}	0.95^{b}	4.25^{b}	4.50^{b}	0.87^{b}	38.22^{b}	5.21^{b}	3.05^{b}	3.36^{b}	35.61^{b}
SY+VE	0.98^{a}	1.05^{a}	4.35^{a}	4.60^{a}	0.97^{a}	39.22^{a}	5.71^{a}	3.55^{a}	3.86^{a}	36.31^{a}
±SE	0.02	0.01	0.02	0.02	0.01	0.29	0.03	0.02	0.07	0.04
P. value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001

$^{a, b, c \text{ and } d}$, means per each column with different superscripts are significantly different (P<0.05).

Selenium is important antioxidant and is an essential component of glutathione peroxidase (GPX), phospholipid hydroperoxide glutathione peroxidase (Ursini *et al.,* 1985) and thioredoxin reductase. Also, vitamin E (VE) functions as an intracellular antioxidant scavenging for free reactive oxygen and lipid hydroperoxidases, and converting them to non-reactive forms, thus maintaining the integrity of membrane phospholipids against oxidative damage and peroxidation (Sinclair *et al.,* 2000). The generation of peroxides is presumed to induce sound CL to undergo luteolysis (Kodaman *et al.,* 1984). H_2O_2 or lipid peroxide have been found to accumulate in the CL during luteal regression (Hesla *et al.,* 1992), while antioxidant vitamins have been reported to be effective against reactive oxygen species in cultured rat luteal cells (Carlson *et al.,* 1995). The previous *in vitro* investigation using bovine luteal cells showed that SE supplementation (as antioxidant) to luteal cells decreased their intracellular lipid peroxide concentrations (Kamada and Ikumo, 1997). Thus, it is possible that the detoxifying effect of SE on peroxide production contributes to the maintenance of CL function. It is likely that functional CL is a tissue which inevitably accumulates peroxide due to their synthesis of P_4, and hence, requires antioxidants to maintain their function. Kamada and Ikumo, (1997) showed that luteinizing hormone (LH) addition to the luteal cultures stimulated P_4 synthesis and increased the intracellular lipid peroxide concentrations of the cells. Selenium is known to be an essential component of antioxidant enzymes, as mentioned above. Thus, the antioxidant effects of SE can explain the increased P_4 production observed in the present study. Harrison *et al*. (1984a) reported that significant SE-dependent GPX activity was detected in luteal tissues (Zagrodzki, 2008) demonstrated a strong positive correlation between GPX activity and P_4 levels in humans. These reports support the idea that SE has a positive effect on CL function.

In vitamin E and selenium deficiency condition, these free radicals accumulate and not only damage cell membranes, but also disrupt several processes linked to the synthesis of steroids (Seagerson and Libby, 1982), prostaglandins (Harrison *et al.,* 1884b) and the development of the embryo (Goff *et al.,* 1999). Negative effect of vitamin E and selenium deficiencies have been observed on ovulation rate (Goto *et al.,* 1992), uterine motility (Robinson, 1996), conception rate and post-partum activities (Archegia *et al.,* 1994).

CONCLUSION

It could conclude that SY and/or VE supplemented rations could use to improve physiological responses and sexual hormones post-lambing of Ossimi ewes under different housing systems. In addition, reproductive performance of ewes post-lambing was the best under the conditions of subsistence in the 1st H compared with 2nd H regardless of different treatments.

ACKNOWLEDGEMENT

The authors wish to thank the Dr. E.M. Ibrahim Lecture of Animal Nutrition, Dep. of Anim. Prod., Fac. of Agric., Minia Univ. for his a lot of helpful cooperation during the experimental work to achieving this study.

REFERENCES

Abozed, G.F. (2009). Influence of housing system on productive and reproductive performances of sheep. M.Sc. Thesis, Fac. Agric., Assiut Univ., Assiut, Egypt.

Abozed, G.F. (2014). Impact of housing types on performance of small ruminant under Upper Egypt conditions.Ph.D. Thesis, Fac. Agric., Assiut Univ., Assiut, Egypt.

Allison, M.B.; R.M. Jose; L. Sender and L.A. Lloyd (2009). Prolactin secretion after hypothalamic differentiation in beef calves:Response to haloperidol, α-methyl-ρ-tyrosine, thyrotropin-releasing hormone and ovariectomy. Animal Reproduction Science. 111: 54-68.

Anderson, L.L.; D.L. Hard; L.S.Carpenter; E.K. Awotwi; M.A. Diekman; A.H. Trenkle and S.J. Cho (1999). Pregnancy, parturition, and lactation in hypophyseal stalk-transected beef heifers. J. Endocrinol. 163: 463-475.

AOAC, (1995). Official Methods of Analysis, 16th ed. Association of Official Analytical Chemists, Washington, DC, USA.

Archegia, C.F.;O.Ortiz andP.J.Hansen (1994). Effect of prepartum injection of vitaminE and selenium on postpartum reproductive function of dairy cattle, Theriogenology. 41: 252-1258

Ashour, G.; M.M. Shafie; S.A. Fawzy and M.S. Sayah (1998). Influence of housing physical properties on physiologicalperformance of suckling Friesian calves. Egyptian J. Anim. Prod. 35 (Suppl. Issue): 33-45.

Ateia, M.M. (1985). Cyclic variation in inhibin and competitive protein binding to gonadotropin during estrous cycle in ewes. Ph.D. Thesis, Theriogenol. Cairo University.

Azamel, A.A. (1984). A study on some factors affecting heat tolerance andperformance of sheep. Ph. D. Thesis, Fac. Agric., Ain Shams Univ.,Cairo, Egypt.

Bednarek, D.; M. Kondracki and S.Cakala (1996). Untersuchungenuber den einfluss von selen und vitamin E auf rotes und weissesblutbild, serum konzentrationeinigermineralstoffe und spurenelementesowieimmunologische parameter beimkalb. DtschTierarztlWochenschr. 103:457-459

Campbell, B.K.; R.J.Scaramuzzi and R.Webb (1995). Control of antral follicle development and selection in sheep and cattle.J ReprodFertil. 49: 335-350.

Cao, Y.; J.F. Maddox; A.M. Mastro; R.W. Scholz; G. Hildenbrandt and C.C. Reddy (1992). Selenium deficiency alters the lipoxygenase pathway and mitogenic response of bovine lymphocytes. Journal of Nutrition. 122: 2121–2127.

Carlson, J.C.; M. Sawada; D.L. Boone and J.M. Stauffer (1995). Stimulation of progesterone secretion in dispersed cells of rat corpora lutea by antioxidants. Steroids. 60: 272-6.

Cay, M. and M. Naziroglu (1999). Effects ofintraperitoneally-administered vitamin E and selenium on the blood biochemical and haematological parameters in rats. Cell BiochemFunct. 17: 143–148.

Chow, C.K., (2001). In: R. Rucker, D.B. Suttle, McComick, L. Machlin and J. Editors, Handbook of vitamins. Marceldekker, New York, pp: 165-196.

Colitti, M. and B. Stefanon (2006). Effect of natural antioxidants on superoxide dismutase and glutathione peroxidase mRNA expression in leukocytes from periparturient dairy cows. Veterinary Research Communications. 30: 19-27.

Di-Mascio, P.; M.E. Murphy and H. Sies (1991). Antioxidant defense systems: the role of carotenoids, tocopherols, and thiols. Am J ClinNutr. 53:194S–200S

Duncan, D.B. (1955). Multiple ranges and multiple F. Test. Biometrics. 11: 1.

El-Sayed, Y.M.S. (2003). Studies of physiological and reproductive performance of goats under different housing systems in newly reclaimed areas. Ph.D. Thesis, Fac. Agric., Cairo Univ., Giza, Egypt.

El-Shahat, K.H. and U.M. Abdel Monem (2011). Effects of Dietary Supplementation with Vitamin E and /or Selenium on Metabolic and Reproductive Performance of Egyptian Baladi Ewes under Subtropical Conditions. World Applied Sciences Journal. 12 (9):1492-1499.

El-Sherbiny, A.A.; M.K. Yousef; M.H. Salem; H.H. Khalifa; H.T.Abd El-Bary and M.H. Khalil (1983). Thermoregulatory responsesof a desert and non-desert goat breed. Al-Azhar J. Agric. Res. 4: 89-95.

Ganie, A.A.; R.P.S. Baghel; V. Mudgal; O. Aarif and G.G. Sheikh (2014). Effect of selenium supplementation on reproductive performance and hormonal profile in buffalo heifers. Indian J. Anim. Res., 48 (1): 27-30.

Goff, J.P. (1999). Dry cow nutrition and metabolic disease in parturient cows. Proceeding Western Canadian Dairy Seminar Red Deer,

Goto, Y.; Y. Noda; K. Narimoto; Y. Umaoka and T. Mori (1992) Oxidative stress on mouse embryonic development in vitro, Free radical biology research. 13: 47-53.

Gutteridge, J.M.C. and B.C. Halliwell (1994). Free radicals and antioxidants in ageing and disease: Fact or Fantasy. In: Antioxidants in nutrition, Health and Disease. Oxford Univ. Press. Oxford, pp: 111-123.

Habig, W.; M.J. Pabst and W.B. Jakoby (1974). Glutathione-S-tranferase, the first enzymatic step in mercapturic acid formation. J. Biol. Chem., 249: 7130-7139.

Hahn, G.L.; T.L. Mader and R.A. Eigenberg (2003). Perspective on development of thermal indices for animal's studies andmanagement. Proceeding of the interaction between climate and animal production symposium, Viterbo, Italy, September, 2003,EAAP Technical Series No. 7: 31-44.

Harrison, J.H. and H.R. Conrad (1984a). Selenium content and glutathione peroxidase activity in tissues of the dairy cow after short-term feeding. J Dairy Sci; 67:2464-70.

Harrison, J.H. and H.R. Conrad (1984b). Effect of selenium intake on selenium utilization by the non-lactating dairy cow, Journal of dairy science. 67: 219-223.

Harrison, J.H.; D.D. Hancock and H.R. Conrad (1984c). Vitamin E and selenium for reproduction of the dairy cow. J Dairy Sci; 67:123-32.

Harrison, R.O.; S.P. Ford; J.W. Young; A.J. Conley and A.E. Freeman (1990). Increased milk production versus reproductive and energy status of high producing dairy cows. J. Dairy Sci. 73: 2749–2758.

Hashim, N. H.; Syafnir and M. Sembiring (2013). Time of PMSG administration: Effect on progesterone and estradiol concentration in synchronized ewes. Biomedical Research. 24 (1): 7-12.

Hesla, J.S.; T. Miyazaki; L.M. Dasko; E.E. Wallach and A.M. Dharmarajan (1992). Superoxide dismutase activity, lipid peroxide production and corpus luteum steroidgenesis during natural luteolysis and regression induced by oestradiol deprivation of the ovary in pseudopregnant rabbits. J ReprodFertil. 95:915-24.

Hogan, J.S.; W.P. Weiss and K.L. Smith (1993). Role of vitamin E and Selenium in host defense against mastitis. J. Dairy Sci., 76: 2795-2803.

Ibrahim, E.M. (2017). Effect of parenteral supplementation of vitamin E plus selenium on nutrient digestibility, productive performance and some serum biochemical indicators of lambs. Egyptian Journal of Sheep & Goat Sciences, 12 (1): 59-70.

Johnson, K.G. (1971). Body temperature liability in sheep and goat duringshort-term exposure to heat and cold. J. Agric. Sci., 77: 267- 274.

Kamada, H.; and H. Ikumo (1997). Effect of selenium on cultured bovine luteal cells. Anim. Reprod. Sci., 46:203-11.

Kamada, H. (2017): Effects of selenium-rich yeast supplementation on the plasma progesterone levels of postpartum dairy cows. Asian-Australas J AnimSci Vol. 30, No. 3:347-354

Kamal, T.H.; A.Z. Mehrez; M.M. El-Shinnawy and A.A. Abou El- Naga (1984). Effect of high environmental temperature on minerals metabolism in Friesian cattle.Proc. 1th Egyptian-British. Conf. Anim. Poul. Prod., Zagazig University, Egypt.

Kirschvink, N.; M.B. De and P. Lekeux (2007). Review: the oxidant/ antioxidant equilibrium in horses. The Vet. J. Doci., 10.1016/J.TVJI.

Kodaman, P.H.; R.F. Aten and H.R. Behrman (1994). Lipid hydroproxides evoke antigonadotropic and antisteroidogenic activity in rat luteal cells. Endocrinology. 135:2723-30.

Kolb, E.; S. KasKousb and J. Scchawer (1997). Nutrional aspects of the importance, utilization, metabolism and the use of vitamin E and selenium in sheep. Berl. Munch. Tierarztl. Wschr., 110:178-184.

Koracevic, D.; G. Koracevic; V.; Djordjevic; S. Andrejevic and V. Cosic (2001). Method for the measurement of antioxidant activity in human fluids. J. Clin. Pathol. 54: 356-361.

Koyuncu, M. and H. Yerlikaya (2007). Effect of selenium-vitamin E injection of ewes on reproduction and growth of their lambs. S. Afr. J. Anim. Sci., 37: 233-236.

Kumari, R.R.; K. Pankaj and T.K. Mondal (2013). Effect of Vitamin E and Selenium on Hematological Parameters in Sub-acute Toxicity of Hexavalent Chromium in Broiler Chick. National Journal of Physiology, Pharmacy & Pharmacology. 3 (Issue 2): 158-161

Lincoln, G.A. and I.J. Clarke (1994). Photoperiodically-induced cycles in the secretion of prolactin in hypothalamo-pituitary disconnected rams: evidence for translation of the melatonin signal in the pituitary gland. J. Neuroendocrinol. 6: 251–260.

Liu, F.; J.J. Cottrell; J.B. Furness; L.R. Rivera; F.W. Kelly; U. Wijesiriwardana; R.V. Pustovit; L.J. Fothergill; D.M. Bravo; P. Celi; B.J. Leury; N.K. Gabler and F.R. Dunshea (2016). Selenium and vitamin E together improve intestinal epithelial barrier function and alleviate oxidative stress in heat-stressed pigs.Exp Physiol.,101.7: 801–810

Lopez, H.; L.D. Satter and M.C. Wiltbank (2004).Relationship between level of milk production and estrous behavior of lactating dairy cows.Animal Reproduction Science. 81(Issues 3-4): 209-223.

Marai, I.F.M.; A.A. El-Darawany; E.A.F. Ismail and M.A.M. AbdEl-Hafez (2006). Tunica dartos index as a parameter formeasurement of adaptability of rams to subtropical conditions ofEgypt. Anim. Sci. J., 77: 487-494.

Meizger, D.A. (1992). Sex steroids effects on the endometrium. Infertile Reproduction Med. Clinc. Amer., 3: 163-186.

Meschy, F. (2000). Recent progress in the assessment of mineral requirements of goats. Livest. Prod. Sci., 64: 9-14.

Meshreky, S.Z. and G.H. Metry (2000). Effect of vitamin E and / or selenium on reproductive performance of New Zealand and White Baladi black doe rabbit under climate conditions of middle Egypt.Pro.3rd Afri. Con. Anim. Agri. 11th Con. Egyptian. S oc. Anim. Prod., pp: 6-9, Nov. Alex. Egypt.

Milad, K.; O. Racz and A. Sipulova (2001). Effect of vitamin E and selenium on blood glutathione peroxidase activity and some immunological parameters in sheep. Vet. Med.Czech. 46: 1-5.

Mohamed, M.Y. (2010). Some studies on improving productive and reproductive performance of local sheep. Ph.D. Thesis, Fac. Agric., Minia Univ., Minia, Egypt.

Mohri, M.; A. Ehsani; M.A. Norouzian; M.H. Bami and H.A. Seifi (2011). Parenteral selenium and vitamin e supplementation to lambs: hematology, serum biochemistry, performance, and relationship with other trace elements.Biol Trace Elem Res, 139:308-316

Naqvi, S.M.K.; V.P. Maurya; R. Gulyani; A. Joshi and J.P. Mittal (2004). The effect of thermal stress on superovulatory response andembryo production in Bharat Merino ewes.Small Rum. Res., 55: 57-63.

NRC, (2007). 'Nutrient requirements of small ruminants sheep, goats, cervids, and newworld camelids.' (National Academies Press:Washington, DC).

Piccione, G. and G. Caola (2003). Influence of shearing on the circadianrhythm of body temperature in sheep. J. Vet. Med. A., 50: 235-240.

Piccione, G.; G. Caola and R. Refinetti (2002). Maturation of daily bodytemperature rhythm in sheep and horse. J. Thermal Biology. 27: 175-178.

Politis, I.N.; J.H. Hindiroglon; J.A. White; S.N. Gilmore; H. William and M. Frigg (1996). Effect of vitamin E on mammary and blood leukocyte function with emphasis on chemo taxis in per parturient dairy cows. Am. J. Vet. Res., 57: 463-471.

Qureshi, Z.I.; L.A. Lodhi and A. Sattar (1997). An apparent effect of immunopotentiation during late gestation on Nili-Ravi buffaloes (Bubalusbubalis). Vet. Res. Commun., 21: 375-380.

Ramos, J.J.; A. Fernandez; M.T. Verde; T. Seaz; M.C. Sanz and M.C. Marca (1998). Effect of inoculation with selenium and / or vitamin E on the immune response of lambs. Med. Vet., 15: 291-296.

Robinson, J.J. (1996). Nutrition and reproduction. Animal Reproductive Science. 42: 25-34.

Robinson, N.E. (2002). Hemostasis. In: Textbook of Veterinary Physiology. J. G. Cunningham (Ed.). St Louis: W. b. Saunders Company, USA.pp. 516-544.

Sado, R.Y.; Á.J.A. Bicudo and J.E.P. Cyrino (2013). Growth and hematology of juvenile pacuPiaractusmesopotamicus (Holmberg 1887) fed with increasing levels of vitamin E (DL-α-tocopheryl acetate).Anais da Academia Brasileira de Ciências. 85(1): 385-393.

SAS (2002). User's Guide: Statistics, Version 9.0 Edition. SAS Institute Inc., Cary, NC, USA.

Sayah, M.S. (2005). Effect of housing conditions on Friesian calvesperformance. Ph.D. Thesis, Fac. Agric., Cairo Univ., Giza, Egypt.

Sbadenov, K. (1985). The effectiveness of different methods of detecting estrous in ewes. Vestirik Sel'Skohyaist Nauki Kazakhstana, 18960: 80-84.

Seagerson E.C. and D.W. Libby (1982). Ova fertilization and sperm number per fertilized ovum for selenium and vitamin E treated Charolais cattle, Theriogenology. 17: 333-341.

Shalaby, T.H.; O. Salama and G. Solouma (1996). Physiological responses to climate changes in Rahmani imported Finn. Rams and their half sub-born to Rahmani recipient in Egypt. J. Anim. Prod., 33: 269-277.

Sinclair, K.D.; M. Kuran; F.E. Gebbie; R.Webb and T.G. McEvoy (2000). Nitrogen metabolism and fertility in cattle:Development of oocytes recovered from heifers offered diets differing in their rate of nitrogen release in the rumen, J. Anim.Sci, 78: 2670–2680.

Smith, O.B. and O.O. Akinbamijo, (2000).Micro-Nutrients and reproduction in farm animal.Anim. Reprod. Sci., 60-61: 544-560.

Sobiech, P. and Z. Kuleta (2002). Usefulness of some biochemical indicators in detection of early stages of nutritional muscular dystrophy in lambs.Small Rumin. Res., 45: 209-215.

Souza, C.L.H.; K. Bruce; K. Campbell and D.T. Baird (1998). Follicular waves and concentration of steroids and inhibinA in ovarian venous blood during the luteal phase of the estrus cycle in ewes with an ovarian autotransplant. J Endocrinol. 156: 563-572.

Ursini, F.; M. Maiorino and C. Gregolin; (1985). The selenoenzyme: phospholipid hydropperoxide glutathione peroxidase. BiochimBiophyActa. 839:62-70.

Van-Eerdenburg, F.J.C.M.; D. Karthaus; M.A.M. Taverne; I. Merics and O. Szenci (2002). The relationship between estrous behavioral score and time of ovulation in dairy cattle. J. Dairy Sci. 58: 1150–1156.

Zagrodzki, R.R. (2008). Selenium status, sex hormones, and thyroid function in young woman. J Trace Elem Med Bio. 22:296-304.

تأثير إضافة خميرة السلينيوم مع أو بدون فيتامين هـ على الاستجابات الفسيولوجية للنعاج الاوسيمي بعد الولاده تحت نظامين إسكان مختلفين

محمود يسن محمد[1] و عيد محمد محمد إبراهيم[1] و عبدالعليم محمد عبد المولي[2]

[1]معهد بحوث الإنتاج الحيواني –وزارة الزراعة--الدقى - الجيزة – مصر.

[2]قسم الإنتاج الحيواني- كلية الزراعة -جامعة الفيوم- الفيوم- مصر.

أجريت هذه الدراسة لتقييم تأثير العلائق المضاف إليها خميرة السلينيوم مع أو بدون فيتامين هـ تحت نظامين إسكان مختلفين على الأداء الفسيولوجي عقب الولاده للنعاج الأوسيمي.

تم استخدام 80 رأس من النعاج الأوسيمي العشار بمتوسط وزن 40.38 ± 0.93 و 39.49 ± 1.12 كجم وكانت تحت تأثير نظامين إسكان مختلفين ، الأول (شبه مفتوحة ذو أرضية خرسانية وتغطية السقف بالاتجاه غربي-شرقي) والثاني (مظللة بالكامل بألواح الأسبستوس الفردية ومن فوقها بالات قش الأرز ذو أرضية ترابية وتغطية السقف بالاتجاه شمالي-جنوبي) على التوالي. قسمت النعاج إلي مجموعتين متساويتان بعد ثلاثين يوم من الولاده (40 نعجة لكل مجموعة) حسب العمر ، ووزن الجسم. وضعت كل مجموعة في نوع إسكان مختلف ثم قسمت كل مجموعة عشوائيا إلى أربع مجموعات فرعية متساوية (كل مجموعة فرعية10 نعاج) ، المجموعة (أ) مجموعة المقارنة وغذيت علي عليقة المقارنة التي تحتوي علي قش الأرز والعلف المركز، المجموعة (ب) غذيت على عليقة المقارنة مضاف إليها 0.3 ملجم خميرة السلينيوم / كجم من العليقة ، المجموعة (ج) غذيت على عليقة المقارنة مضاف إليها 40 ملجم فيتامين هـ / كجم من العليقة و المجموعة(د) غذيت على عليقة المقارنة مضاف إليها خميرة السلينيوم مع فيتامين هـ.

أظهرت النتائج أن المسكن الأول (شبة المفتوح) ذات معنوية مرتفعة في درجة حرارة الهواء في الصباح وعند الظهيرة بالمقارنة بالمسكن الثاني (المظلل تماماً). كما أن المسكن الثاني حصل على قيمة أقل لمتوسط درجة حرارة الهواء اليومي (24.82 مº) درجة مئوية مقارنة بالمسكن الأول (30.90 مº). كما كانت الرطوبة النسبية أعلى بشكل معنوي في الصباح عن الظهيرة في كلا المسكنين. كان مؤشر الحرارة والرطوبة يتراوح من 61.20 إلى 64.17 ومن 87.10 إلى 91.34 في الصباح ووقت الظهيرة على التوالي في نظامي التسكين. على الرغم من أن قيمة مؤشر الحرارة والرطوبة في الصباح ووقت الظهيرة كانت منخفضة في النظام المظلل مقارنة بالنظام شبة المفتوح. القياسات التنظيمية الحرارية للنعاج بعد الولاده في الصباح ووقت الظهيرة تأثرت بإضافة خميرة السلينيوم مع فيتامين هـ في العلائق تحت نظم التسكين المختلفة وأظهرت معنوية منخفضة في المجموعة د (العليقة المضاف اليها خميرة السلينيوم + فيتامين هـ) ثم يليها المجموعة ب (العليقة المضاف اليها خميرة السلينيوم فقط) ثم المجموعة ج (العليقة المضاف اليها فيتامين هـ فقط) بمقارنة بمجموعة الكنترول أ في الصباح ووقت الظهيرة في نظامي الاسكان. كانت النتائج معنوية ($P<0.01$) في معظم قياسات الهيماتولوجي (الهيموجلوبين، كرات الدم الحمراء، الهيماتوكريت،الصفائح الدموية ، كرات الدم البيضاء و العدد النوعي لخلايا الدم البيضاء) تحت نظام التسكين المظلل بالمقارنة بالنظام شبة المفتوح. كان مستوي الانزيمات المضاده للأكسده مرتفع في المجموعة د (العليقة المضاف اليها خميرة السيلينيوم + فيتامين هـ) بالمقارنة بالمجموعات الأخري خاصة مجموعة المقارنة (مجموعة أ). النعاج المعاملة بخميرة السلينيوم مع فيتامين هـ وصلت مبكرا إلى أول دورة شبق بعد الولادة مع أعلى وزن جسم وأقصر مدة شبق عن النعاج الأخري في المسكن الأول والثاني. كما لوحظ ارتفاع معنوى ($P<0.01$) في متوسط تركيز هرمون البروجسترون في كل المجموعات المختبرة بالمقارنة بمجموعة الكنترول (مجموعة أ) تحت نظامي الإسكان المختلفين وهذا يعطي مؤشر علي وجود الجسم الأصفر في بعض الحيوانات المعاملة. أيضا كان هناك زيادة معنوية ($P<0.01$) في تركيز هرمون البروجسترون والاسترادايول وذلك في المجموعة د (العليقة المضاف اليها خميرة السلينيوم + فيتامين هـ) عند اليوم 8 ، 12 ، 16 ، 20 و 24 بعد الولادة.

ومن هنا يمكن استنتاج أن العلائق المحتوية علي خميرة السلينيوم مع أو بدون فيتامين هـ يمكن ان تحسن من الاستجابة الفسيولوجية للنعاج الاوسيمي عقب الولاده تحت نظم إسكان مختلفة.