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Effect of Chromium and Selenium-E on Progesterone and Estradiol-17β Levels during Reproductive Cycle of Baladi Female Goats under Egyptian Conditions

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ABSTRACT

The effect of chromium and selenium with vitamin E on progesterone (P_4) and estradiol-17 β (E_2) levels of Baladi female goats was the objective of this study as new techniques for improving the reproductive performance of Egyptian goats. Seventy-two of mature Baladi does were used through two conditions of mild and hot climates (36 animals / season). The animals were randomly divided into three equal groups, the 1st is the control group, the 2nd group was supplemented by chromium in capsules and the 3rd group was intramuscularly injected twice a week with 2ml VITESELEN®, (0.5 mg selenium and 10.7 IU vitamin E, Se-E). Serum hormones levels were assessed in the three experimental goats at the estrous, pregnancy and postpartum periods. The results showed that P_4 levels during estrous cycle and mid-pregnancy periods were significantly higher in mild climate than in hot climate while opposite trend was found during early and late pregnancy as well as postpartum period. E_2 levels during postpartum period were significantly higher in hot climate than in mild while during estrous cycle no significant differences in E2 levels due to season. Chromium showed significant ($P<0.05$) increase in P_4 levels in goats during each of estrous cycle and pregnancy periods and showed significant decrease in P_4 levels in goats during postpartum period as compared with control. Selenium-E significantly increased the concentration of P_4 in goats during each of the luteal phase of estrous cycle, pregnancy and at 30th day postpartum periods as compared with control. The opposite trend was found at 15th and 45th days postpartum. No significant difference

KEYWORDS

Chromium, Selenium-E, Heat Stress, Progesterone, Estradiol-17β, Goats.

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in P4 due to Selenium-E during follicular phase of estrous cycle. Chromium showed significant decrease in E_2 levels in goats on 15th and 45th days postpartum period while no significant differences in E2 levels due to chromium treatment during estrous cycle and 30th day of postpartum period. Selenium-E increased significantly E_2 level during estrous cycle and postpartum periods.

INTRODUCTION

Heat stress has a reducing effect on both the reproductive and productive efficiency of farm animals. It has been shown to alter the duration of estrus, conception rate, endocrine status, follicular growth and development; early embryonic development and fetal growth **(Jordan, 2003).** The breeding season of goats begins when the photoperiod become shorter, depending on daylight, breed and diet (**Chemineau *et al.* 1999**). In Egypt, as the days begin to shorten in the late summer and early autumn, a regular estrus cycle is initiated; and in late winter and early spring when the days are lengthening; partial anestrus occurs. Egyptian Baladi goats shows normal breeding season at mid-summer and continue through the autumn season. However, a considerable percentage of Baladi goats exhibit estrus signs during out-of-season period (32%) (**El-Tarabany *et al.*, 2017 & 2018**).

In goats, heat stress reduced plasma concentrations of estradiol and lowered follicular estradiol concentration, LH receptor level, delayed ovulation **(Ozawa *et al.*,2005),** altered follicular growth **(Roth *et al.*,2000 and Hansen, 2009)**, and disrupt the development and function of the oocytes **(AL-Katanani *et al.*,2002; Sartori *et al.*,2002 and Hansen, 2009)**. **Roth *et al.* (2000)** suggested that early atresia in medium sized follicles because of heat stress could be associated with low estradiol production by granulosa cells and increased progesterone concentrations in the follicular fluid of heat-stressed cows**.** In addition, heat stress can cause increased cortisol secretion **(Wise *et al.*, 1988 and Elvinger *et al.*, 1992),** and ACTH has been reported to block estradiol-induced sexual behavior **(Hein and Allrich, 1992). Emesih *et al.* (1995)** reported that pregnant doe goats exposed to heat stress showed higher plasma progesterone concentrations than in those maintained at moderate ambient temperature.

Studying chromium importance as an essential element for livestock animals intensively started in 1990s **(Pechova and Pavlata 2007). Garcia *et al.* (1997)** have studied the effect of Cr-picolinate supplementation on sensitivity of tissues to insulin, ovulation rate, and progesterone and oxytocin secretion; Cr supplementation had a positive effect on the ovulation rate but progesterone concentrations remained unchanged. A positive effect of Cr supplementation on the insemination index, interval and service period has been established **(Bonomi *et al.*, 1997 and Pechova *et al.*, 2003)**. Selenium, an essential part of the antioxidant defense system, plays an important role in the growth and health of humans and livestock through its participation in several important enzymes and enzyme reactions **(Surai, 2006).** Selenium deficiency has been related to reproductive failures in ruminants**,** and Vitamin-E is an important complementary factor **(Buchanan-Smith *et al.*, 1969).**

The issues of reproduction in relation to Cr supplementation have been devoted relatively little attention, so this paper aims to find out the effect of chromium and selenium-E administration on progesterone and estradiol-17β concentrations during estrous cycle, pregnancy and postpartum periods of Baladi doe goats under Egyptian conditions.

MATERIALS AND METHODS

Animals and feeding:

This experiment was carried out in Goats Experimental Farm, Nuclear Research Center, Atomic Energy Authority, Inshas; (latitude 31º 12' N to 22 º 2' N, longitude 25 º 53' E to 35 º 53' E). The experimental animals were healthy and clinically free of external and internal parasites and were fed basal ration of concentrate feed mixture (CFM) according to the allowances of **NRC (2007)** of goats. The CFM composed of 37.4% wheat bran, 27% yellow corn, 12.5% soybean meal, 10.0% undecorticated cottonseed cake, 5% rice bran, 4% sugarcane molasses, 3% limestone, 1% sodium chloride and 0.1 vitamin and minerals premix. Feed mixture was offered once daily at 9:00 a.m., based on 3.5% of body weight. Barseem hay was offered *ad libitum*. Fresh drinking water was available at all time.

Animal housing:

All experimental animals were kept in semi-open pens throughout the experimental period. These pens were provided with enough shade and ventilation in summer and protection from rain in winter. The does were allowed to graze five hours daily at least.

Experimental design:

Seventy-two mature female goats (36 animals/ season) aged 2-3 years old with average body weigh 25 ± 1.5 kg were randomly divided into three equal groups. Animals in the 1st group were kept as control, the 2nd group was supplemented by chromium (chromium chloride trivalent), 0.8 mg/head/day as capsules **(Williams *et al.*, 1994)** and the 3rd group was intramuscularly injected with 2 ml VITESELEN®, contained 0.5 mg selenium and 10.7 IU vitamin E/head/day.

Estrus synchronization and blood sampling:

All groups received 10 ml of PGF2α (lutalyse) in double dose (5 mg/ dose, IM) at 11 day-intervals, followed by 500IU of hCG; then after 24 hours three fertile bucks (one buck for each group) were introduced to the does and allowed to be with does for two successive estrous cycles for estrous detection and natural mating. Blood samples were collected from the jugular vein in evacuated glass tubes, and kept at room temperature from 30 to 60 min for clotting, then centrifuged at 3000 rpm for 15 min to separate serum. After that serum was stored at -20°C until analyzed. Samples were collected throughout different stages of estrous cycle, according to **Fatet *et al.* (2011);** monthly during pregnancy and every 15-day up to 45 days postpartum.

Ambient temperature, relative humidity and temperature humidity index:

The ambient temperature and relative humidity were recorded daily from meteorological station of Atomic Energy Authority during the whole experimental period. The temperature humidity index (THI) was calculated during mild and hot climates according to **Marai *et al.* (2000)** as**:**

$$THI = db\ ^oC - [(0.31 - 0.31RH) \times (db\ ^oC - 14.4)]$$

where, THI= temperature humidity index, db °C= dry bulb temperature in Celsius and RH = relative humidity 100÷. A value for THI < 22.2 was considered remarkably an absence of heat stress, while the values from 22.2 to 23.3 referred to moderate (mild) heat stress, 23.3 to <25.6 referred to severe heat stress and >25.6 referred to very severe heat stress.

Table (1) : *Mean Values of THI during the experimental period.*

Climate	Ambient temperature		Relative humidity values %		THI	
	Max	Mini	Max	Mini	Max	Mini
Mild	23.47	14.24	80.01	27.44	22.9	13.9
Hot	34.15	23.28	77.91	20.30	32.8	23.5

Mild= October, November, December, January, February and March; Hot= May, June, July, Augustus, September, October.

Progesterone and estradiol-17β (P_4 and E_2):

Serum P4 (ng/ml) and E2-17β (Pg/ml) concentrations were determined using Coat-A-count I^{125} RIA kits obtained from Immunotech a Beckman Coulter Company, Czech Republic.

Statistical analysis:

Data were expressed as mean ±SE. Data were analyzed statistically by GLM procedure of the SAS program **(SAS, 1998)** according this equation**:**

$Y_{ijk} = \mu + S_i + T_j + (ST)_{ij} + e_{ijk}$ where, Y_{ijk}= the dependent variables estimated, µ= Overall mean, S_i= the effect of i^th^ season (1=mild and 2=hot), T_j= the effect of j^th^ treatment (1=control, 2=chromium and 3=selenium-E), ST_{ij}= the effect of interaction between season and treatment and e_{ijk}= random error.

Duncan's Multiple Range test was used to detect the differences among means of the experimental groups **(Duncan, 1955).**

RESULTS

Effect of climate conditions and treatments on progesterone (P_4) levels.

Inspection the effect of treatments on $\mathbf{P_4}$ concentrations, it is noticeable that P4 levels were significantly higher in mild climate than in hot with the highest value 19.53 ng/ml at luteal phase in mild climate versus11.21 ng/ml in hot one. Cr supplementation resulted in significant increase in (P<0.05) P4 level during estrous cycle compared with other groups. The response to Cr treatment found to be a higher magnitude (25.39 ng/ml) during luteal phase, followed by Se-E (13.11ng/ml). Se-E does have higher (P<0.05) P4 concentration at luteal phase than control, with values of 11.79 ng/ml *vs.* 6.57 ng/ml, respectively **(Table 2).**

Under mild climate conditions, treated groups were higher (P<0.05) in P4 than control during estrous cycle. Does of Cr group had the highest in P4 levels (40.40 ng/ml) at luteal phase, followed by Se-E (13.86 ng/ml). On the other side, under hot climate, Cr or Se-E supplementations had no significant effect on P4 concentrations as compared to control at two the phases of estrous cycle. Results obtained revealed that serum $\mathbf{P_4}$ levels significantly (P<0.05) affected by climate, treatment and their interactions during pregnancy **(Table 2).**

Treating does by Cr or Se-E increased (P<0.05) P4 concentrations during early, mid- and late-pregnancy more than control. Cr treatment almost had P4 concentrations higher than Se-E, the highest value of 45.55 ng/ml was at mid-pregnancy, followed by 31.22 ng/ml for Se-E versus 21.72 ng/ml for control. During early and late-pregnancy, there was no significant difference between Cr and Se-E groups in P4 levels. Marked increase in P4 concentrations was found due to Cr and Se-E treatments with mean values of 62.95 and 39.61ng/ml, respectively, at mid-pregnancy of mild climate. The significant effect due to Cr or Se-E treatments under hot climate conditions was an increase (21.17 ng/ml, P<0.05) at early pregnancy and a decrease (21.24 ng/ml) at late pregnancy comparing with control, otherwise the treatments did not show significant differences in P4 levels during pregnancy period **(Table 2).**

During postpartum period Cr treatment showed significant decrease (P<0.05) in P4 concentration on 15^th^ and 54^th^ as compared with control especially under hot climate conditions. On the other side, Se-E resulted in an increase (5.05ng/ml; P<0.05) in P4 concentration on day-30 PP comparing with other groups. This increase was clearly shown during hot climate with mean values 9.36ng/ml vs. 1.74 and 1.17ng/ml for Se-E, Cr and control, respectively. Otherwise, both treatments were lower than control (**Table 2).**

Table (2) : *Effect of chromium and selenium-E on progesterone levels (ng/ml; means ±SE) during estrous, pregnancy and postpartum periods of Baladi does.*

Items	Progesterone (ng/ml; means ±SE)							
	Estrous cycle		Pregnancy period			Postpartum period		
	Follicular Phase	Luteal phase	Early	Mid	Late	15-day PP	30-day PP	45-day PP
Climate condition (s)								
Mild	2.10 ±0.19	19.53 ±2.71	9.72 ±0.6	39.24 ±4.41	22.22 ±1.9	0.95 ±0.04	0.61 ±0.02	0.38 ±0.02
Hot	1.62 ±0.05	11.21 ±0.56	18.88 ±0.8	26.42 ±1.5	25.17 ±1.1	2.15 ±0.12	4.42 ±0.62	1.87 ±0.16
***P*- value**	0.001	0.0001	0.0001	0.0001	0.069	0.0001	0.0001	0.0001
Treatments								
Control	1.66^{B} ±0.09	7.60^{C} ±0.75	12.02^{B} ±1.2	21.72^{C} ±1.6	18.56^{B} ±2.2	1.77^{A} ±0.19	1.35^{B} ±0.17	1.85^{A} ±0.29
Cr	2.39^{A} ±0.30	25.39^{A} ±3.40	15.09^{A} ±1.5	45.55^{A} ±6.1	27.09^{A} ±1.5	1.27^{C} ±0.07	1.14^{B} ±0.13	0.73^{C} ±0.08
Se-E	1.53^{B} ±0.07	13.11^{B} ±0.68	15.80^{A} ±1.0	31.22^{B} ±1.9	25.43^{A} ±1.6	1.61^{B} ±0.17	5.05^{A} ±0.95	0.79^{B} ±0.1
***P*- value**	0.0001	0.0001	0.003	0.0001	0.0001	0.0001	0.0001	0.0001
Climate x Treatments interactions								
Mild								
Control	1.65^{b} ±0.18	4.32^{c} ±0.06	7.01^{d} ±0.3	15.15^{d} ±0.2	9.76^{c} ±1.3	0.88^{d} ±0.05	0.53^{c} ±0.03	0.46^{d} ±0.016
Cr	3.35^{a} ±0.33	40.40^{a} ±2.49	9.00^{d} ±0.5	62.95^{a} ±8.9	27.29^{a} ±2.8	1.16^{c} ±0.08	0.55^{c} ±0.02	0.33^{e} ±0.012
Se-E	1.30^{b} ±0.01	13.86^{b} ±0.58	13.16^{c} ±1.3	39.61^{b} ±1.5	29.63^{a} ±2.4	0.80^{d} ±0.02	0.75^{c} ±0.04	0.33^{e} ±0.01
Hot								
Control	1.66^{b} ±0.10	10.89^{b} ±0.63	17.03^{b} ±1.3	28.29^{bc} ±1.5	27.36^{a} ±2.5	2.65^{a} ±0.08	2.17^{b} ±0.10	3.25^{a} ±0.01
Cr	1.44^{b} ±0.05	10.38^{b} ±0.94	21.17^{a} ±1.6	28.14^{bc} ±3.4	26.91^{a} ±1.3	1.38^{c} ±0.12	1.74^{b} ±0.03	1.14^{c} ±0.05
Se-E	1.76^{b} ±0.11	12.36^{b} ±1.22	18.45^{ab} ±1.1	22.82^{cd} ±0.7	21.24^{b} ±1.1	2.42^{b} ±0.08	9.36^{a} ±0.63	1.23^{b} ±0.02
***P*- value**	0.0001	0.0001	0.01	0.0001	0.0001	0.0001	0.0001	0.0001

Means with different letters (A, B and C or a, b, c,...) in the same column are significantly different at ($P<0.05$).

Effect of climate conditions and treatments on estradiol-17β (E_2) levels.

It is obviously clear that, female goats treated with Cr or Se-E were higher in E_2-17β concentrations more than control throughout follicular and luteal phases of estrous cycle, but the significant (P<0.05) increase was due to Se-E injection with mean value of 108.56 pg/ml during follicular phase (**Table 3**).

Under mild conditions, the significant (P<0.05) increase in E_2-17β was 134.23 and 39.72pg/ml during follicular and luteal phases, respectively due to Se-E supplementation. However, Cr increased E_2-17β concentrations more than control throughout estrous cycle of mild or hot climate conditions. This increase was significant (P<0.05) at luteal phase of hot season with mean value of 31.52pg/ml vs. 26.06 pg/ml for control **(Table 3).**

Table (3) : *Effect of chromium and selenium-E on Estradiol-17β levels (pg/ml means ±SE) during estrous and postpartum periods of Baladi does.*

Items	Estradiol-$_{17β}$ (pg/ml; means ±SE)				
	Estrous cycle		Postpartum period		
	Follicular phase	Luteal phase	15-day PP	30-day PP	45-day PP
Climate condition (s)					
Mild	76.42 ±8.05	24.17 ±2.14	29.27 ±1.8	38.73 ±3.30	34.84 ±2.3
Hot	78.15 ±2.24	28.22 ±0.77	64.32 ±2.5	47.04 ± 2.30	41.32 ±3.7
***P*- value**	0.75	0.2	0.0001	0.005	0.029
Treatments					
Control	57.00^{B} ±2.90	20.74^{B}±1.44	48.32^{B} ±5.7	35.45^{B} ±2.9	40.08^{B} ±2.8
Cr	66.29^{B} ±3.45	24.45^{B}±1.56	36.43^{C} ±3.2	34.90^{B} ±3.3	20.96^{C} ±1.5
Se-E	108.56^{A} ±8.03	33.39^{A}±2.04	55.65^{A}±3.4	58.23^{A} ±1.9	53.19^{A} ±3.4
***P*- value**	0.0001	0.0001	0.0001	0.0001	0.0001
Climate x Treatments interactions					
Mild					
Control	41.23^{c} ±2.9	15.43^{d}±1.28	21.49^{c} ±1.3	25.49^{d} ±2.5	30.26^{b} ±0.23
Cr	53.80^{c} ±4.02	17.38^{d} ±0.24	26.04^{c} ±3.3	29.43^{d} ±3.7	21.05^{b} ±1.12
Se-E	134.23^{a} ±11.47	39.72^{a} ±2.98	40.27^{b} ±1.4	61.27^{a} ±3.6	53.22^{a} ±1.1
Hot					
Control	72.78^{b} ±4.47	26.06^{c} ±1.35	75.14^{a} ±2.2	45.41^{bc} ±3.5	49.91^{a} ±0.41
Cr	78.77^{b} ±2.27	31.52^{b} ±1.01	46.81^{b} ±3.4	40.38^{c} ±5.1	20.88^{b} ±2.8
Se-E	82.89^{b} ±4.28	27.07^{c} ±1.11	71.02^{a} ±1.6	55.32^{ab} ±1.1	53.16^{a} ±6.9
***P*- value**	0.0001	0.0001	0.0001	0.002	0.008

Means with different letters (A, B and C or a, b, c,) in the same column are significantly different at (P<0.05).

On the other hand, treating does with Cr throughout postpartum period did not reveal any enhancement in E_2-17β levels neither in hot nor mild climates. However, Se-E injection showed significant enhancement in E_2-17β during days of postpartum with the highest mean value of 58.23pg/ml on day-15 postpartum. Inspection data of climate and treatment interactions, the increase of E_2-17β due to Se-E on 15^{th}, 30^{th} and 45^{th} days of PP was observed only under mild climate conditions (**Table 3).**

DISCUSSION

Effect of climate conditions and treatments on progesterone levels.

Dietary use of a chromium supplementation for approximately 2 months in peak and early lactation cows under natural high ambient temperatures had no effect on progesterone levels (**Nikkhah *et al.* (2011)**. In this respect, the present Cr results of estrous cycle and pregnancy under hot conditions are in agreement with those of **Nikkhah *et al.* (2011)** but not with results of postpartum since it was almost lower in progesterone than control. The obtained postpartum results agreed with the findings of **Yang *et al.* (1996)** who found that progesterone levels did not differ in Cr-supplemented cows from control postpartum cows at week 2, while progesterone level at postpartum week 6 was significantly lower in treated cows than control with value about 2.57 *vs.* 3.34 ng/ml, respectively. Furthermore, **Burton *et al.* (1995)** found no significant effect of Cr supplementation on p4 at weeks -1, 0, 1 and 2 post calving, although Cr-supplemented cows tended to have lower P4 concentrations that declined more rapidly post calving than control cows. On the other side, **Ganie *et al.* (2014)** stated that supplementation of Se (0.2 ppm Se selenite) had no effect ($P<0.05$) on serum P4 profile in buffalo heifers during estrous cycle compared with control group. The present results agreed with the later authors during estrous cycle at hot and mild season (**Table2**).

In pregnant Baladi goats observed that Se-E increased serum P4 during early, mid- and late-pregnancy **(Esa, 2011 and Habeeb *et al.*,2012)**. In the same trend, plasma P4 concentration increased during pregnancy, reaching its highest level at 19-20^{th} weeks and then declined during the last 2 weeks before parturition **(Krajnicakova *et al.*, 2003)**. In addition, **Kamada *et al.* (2014)** in pregnant heifers found that Se supplementation (0.3 ppm sodium selenite) increased plasma P4 in the 29–39 weeks of pregnancy from 4.98 to 6.86ng/ml, on average. The authors suggested that Se contributes to maintaining the function of the corpus luteum and/or placenta in the latter period of pregnancy. Postpartum results clearly showed highly significant increase in P4 concentration at 30^{th} day postpartum due to Se-E injection especially under hot climate conditions. These are in the same trend of **khan *et al.* (2015)** in buffalo. The authors estimated progesterone from 30 days postpartum to evaluate the effect of vitamin E and mineral supplementation on the initiation of cyclicity in the experimental buffaloes, Se-E group showed early initiation of cyclicity (32 days postpartum) compared with control group (35 days postpartum). Cyclicity in most of the animals might have been initiated earlier than 30 days as was evident from P4 concentration. **Mavi *et al.* (2006)** found that supplementation of vitamin E and selenium to Murrah buffaloes during pre-partum period resulted in early initiation of postpartum ovarian activity and early exhibition of first postpartum heat, as well as, duration of first P4 rise of over 1 ng/ ml of plasma was found to be significantly longer in Se-E supplemented buffaloes.

Effect of climate conditions and treatments on estradiol-17β levels.

Feed supplementation with 0.25, 0.5 and 1.0 mg Cr kg^{-1} dry matter, respectively, significantly developed graffian follicles and estrus incidence of dairy heifers **(Biswas *et al.*, 2006)**. In this respect, the current increase of estradiol-17β throughout estrous cycle due to Cr goes in harmony with those of **Biswas *et al.* (2006)** .This increase in E_2 concentrations during estrus may reflect Cr enhancing effect on graffian follicles growth and maturation and subsequently released amount of estradiol-17β from granulose cells. In addition, it may be due to minimization of the early atresia of medium sized follicles caused by heat stress **(Roth *et al.*,2000)** and this may attribute the obtained increase of E_2 ($P<0.05$) at luteal phase under hot season condition.

It is known that heat stress reduces plasma concentrations of E2 and lower follicular E2 concentration, aromatase activity, LH receptor level, and delay ovulation **(Ozawa *et al.,* 2005)**. Some effects of heat stress may involve adrenocorticotropic hormone (ACTH) and increase cortisol secretion. ACTH has been reported to block E2 induced sexual behavior **(Habeeb *et al*., 2012 and Hein and Allrich, 1992).** Increased corticosteroid secretion has been suggested, because this can inhibit GnRH and thus LH secretion **(Gilad *et al.,* 1993).** Many studies confirmed the decrease of cortisol due to Cr administration, which in turn may act on alleviate the adverse effects of heat stress on reproductive hormones **(Pechova *et al.*,2002, Louise, 2003 and Soltan *et al.,* 2012)**.

Cr exerts a significant influence on follicular maturation and luteinizing hormone. Postpartum results indicated that Cr supplementation had no effect on enhancing estradiol-17β levels during postpartum period neither under mild nor hot season conditions **(Tuormaa, 2000)**. These results are in agreement with those of **Burton *et al.* (1995)** who found no significant effect of Cr supplementation on estradiol on weeks -1, 0, 1 and 2 post calving. On the other side, Se-E increased E_2 concentrations during estrus and postpartum period not only under mild conditions but also under hot season. Administration of 0.5-1.5 mg/ml selenium and 50 mg vitamin E provides a real strong influence to the increased concentrations of estrogen (E_2) during estrus in dairy cows compared with control group (9.9 *vs.* 7.81 pg/ml, respectively) **(Prasdini, *et al.,* 2014)**. The supplementation of vitamin E-selenium to repeat breeder and anoestrous buffaloes relieved the oxidative stress as shown by the reduced levels of lipid peroxidation, activities of superoxide dismutase and glucose-6-phospahate dehydrogenase along with increased vitamin E and β-carotene and improved blood biochemical composition in vitamin E-Se supplemented animals **(Nayyar and Jindal, 2010).**

In conclusion, Cr showed slight increment in E2-17β concentrations at estrous but not in postpartum period, however it enhanced ($P<0.05$) P4 levels during different stages of goats reproductive cycle. Se-E increased ($P<0.05$) E2 levels at estrous, pregnancy and PP periods especially under mild climate conditions, the same trend was obtained for P4 concentrations, except postpartum period.

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مجلة
التقنيات النووية
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تأثير الكروميوم والسيلينيوم-هـ علي مستويات البروجستيرون والإستراديول-١٧بيتا خلال الدورة التناسلية لإناث الماعز البلدي تحت الظروف المصرية

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إجريت هذه التجربة لدراسة تأثير معاملة اناث الماعز المحلية بالكروميوم والسيلينيوم-هـ علي مستويات هرموني البروجستيرون والإستراديول 17-بيتا خلال دورة الشبق ومرحلة الحمل وما بعد الولادة للحيوانات كطرق لتحسين أداء الماعز المصرية تحت الظروف المحلية.

وقد استخدم فى هذا البحث 72 عنزة بلدي ناضجة بمتوسط عمر 2-3 سنوات ومتوسط وزن الجسم 25 كجم خلال موسمى دراسه وهما ظروف المناخ المعتدل والحار بحيث 36 حيوان فى كل موسم وفى كل موسم قسمت الحيوانات عشوائيا الي ثلاث مجاميع الاولي بدون معاملات (مجموعه ضابطه) والمجموعة الثانية تم معاملتها بمادة الكروميوم – في صورة كلوريد الكروميوم- وبمعدل 0.8 ملجم/رأس/ يوم (مجموعة الكروميوم) أما المجموعة الثالثة تم حقنها في العضل بـ 2مل مرتين اسبوعياً من مخلوط السيلينيوم+فيتامين هـ (فايتسيلين) وهذة الكمية تعادل 0.5 ملجم من السيلينيوم و 10.7 وحدة دولية فيتامين هـ /رأس/يوم.

وكانت الحيوانات موضوعة في حظائر نصف مفتوحة خلال فترة التجربة وسمح لها بالرعي لمدة خمسة ساعات يومياً علي الأقل وقد تم تقدير مستوي الهرمونات في سيرم الدم خلال المراحل التناسليه المختلفة.

وقد أوضحت النتائج أن مايلى:

1. أرتفاع معنوي في مستوي هرمون الإستراديول خلال مرحلتي النو الحويصلي والجسم الأصفر وفترة ما بعد الولادة نتيجة المعاملة بالسيلينيوم-هـ مقارنة بالكنترول،
2. كانت مستويات الهرمون أعلي تحت ظروف الجو المعتدل عن الموسم الحار داخل نفس المجموعة خلال معظم المراحل التناسلية المختلفة.
3. المعاملة بالكروميوم ادت الي إرتفاع –وان كان غير معنوي- في مستوي الإستراديول خلال مرحلتي دورة الشبق ولم يكن للكروميوم تاثير واضح علي مستوي الهرمون خلال فترة ما بعد الولادة لاناث الماعز المحلية تحت ظروف المناخ المعتدل او الحار.
4. أظهرت المعاملة بالكروميوم تأثيراً معنوياً علي مستوي هرمون البروجستيرون خلال دورة الشبق والحمل مقارنة بالكنترول في حين لم يكن له تأثير واضح خلال فترة ما بعد الولادة بخلاف اليوم الـ15 ما بعد الولادة تحت ظروف المناخ المعتدل.
5. المعاملة بالسيلينوم-هـ ادت الى زيادة تركيز البروجستيرن بشكل معنوي مقارنة بالكنترول خلال مرحلة الجسم الاصفر وفترات الحمل وذلك في الجو المعتدل ولم يكن له تأثير خلال فترة مابعد الولادة عدا اليوم الـ30 تحت ظروف الجو الحار.

1. قسم الإنتاج الحيواني –كلية الزراعة – جامعة بنها.
2. قسم التطبيقات البيولوجية – شعبة تطبيقات النظائر المشعة – مركز البحوث النووية – هيئة الطاقة الذرية.