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EFFECT OF TREATMENT WITH L-CARNITINE, CO-ENZYME Q10 AND ZINC-METHIONINE AS STIMULANTS ON SEMEN QUALITY AND SOME BLOOD PARAMETERS OF DAMASCUS GOAT BUCKS DURING SUMMER SEASON OF EGYPT.

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ABSTRACT

A total number of twelve healthy Damascus goats' bucks aged 1.7-2.3 years and weighed 56.7±1.34 kg were used to study the effects of treatment with L-carnitine, Co-enzyme Q10 and Zinc-methionine on semen quality and some blood parameters in Damascus goat bucks. The bucks were assigned to four groups (3 bucks in each group). The first group(control) was fed basal ration composed of 60% concentrate feed mixture (CFM) plus 20% clover hay and 20% rice straw. The 2nd group was fed basal ration and injected with 50 mg L-carnitine/Kg live body weight twice weekly. The 3rd group was fed basal ration and injected with 6 mg Coenzyme Q10/kg live body weight twice weekly. The 4th group was fed basal ration and orally administered daily 25 mg Zinc-methionine. Physical semen characteristics, physiological response parameters and blood biochemical parameters were studied.

The obtained results showed that treatment with L-carnitine, Coenzyme Q10 and Zinc-methionine significantly (P<0.01) improved semen quality of Damascus goat bucks. Bucks injected with 50 mg L-carnitine/Kg live body weight recorded the best values of physical semen characteristics as compared to goats injected with 6 mg Coenzyme Q10/ kg live body weight or those administered 25 mg Zinc-methionine. Hair, skin and rectal temperatures were significantly (P< 0.0%) decreased in goat bucks treated with L-carnitine, Coenzyme Q10 and Zinc-methionine than the control group. Values of pulse rate (beat/min) and respiration rate (beat/min) were not significantly affected by treatment with L-carnitine, Coenzyme Q10 and Zinc-methionine.

Treatment with L-carnitine, Coenzyme Q10 and Zinc-methionine were not significantly affected on most of all blood biochemical parameters with the exception of AST, Testosterone and cortisol levels

were significantly (P<0.05 or P < 0.01) affected in the treated groups compared to the control group. Goat bucks injected with 50 mg L-carnitine recorded the lowest values of AST and the highest values of testosterone as compared to the other groups. However, goat bucks injected with Coenzyme Q10 6 mg/ kg live body weight recorded the highest value of cortisol as compared with the other groups.

***In conclusion**, injection of Damascus goat bucks with L-carnitine at level of 50 mg/Kg body weight or CoQ10 at level of 6 mg/Kg body weight or orally administration of zinc methionine at level of 25 mg/head /day improve their semen quality, maintain their health status and protect them from heat stress during hot summer season of Egypt.*

Keywords: Goats, L-carnitine, Co-enzymeQ10, Zinc-methionin, semen quality, physiological response and blood biochemical.

INTRODUCTION

In Egypt, the high temperature in summer season is accompanied with the high relative humidity, which is normally over 85% during the day and can reach 100% during the night (Marai *et al*. 2001). Temperature-humidity index (THI) is mild about 20.2 (from January until May) and high about 30.1 in hot months (from June until October) (Marai *et al*. 2002; Marai *et al*. 2005). Several studies have suggested that to adversely affects the heat exposure get energy to all cell functions of the animal body.

L-carnitine is a natural, vitamin-like amino acid, synthesized within the body from lysine and methionine (Vaz *et al*. 2002), and is very important in the metabolism of lipids. It carries long chain fatty acids to the mitochondria for beta oxidation, which produces energy (ATP) needed by the cells for proper functioning (Hoppel 2003; Ramsay *et al*. 2001). Also, L-carnitine plays an important role in the processes of cellular detoxification, since it removes excess of acyl-CoA from the mitochondria, which has a toxic effect (Arrigoni- Martelli and Caso 2001). It also protects cellular membranes against oxidative damages resulting from peroxidation of polyunsaturated fatty acids that are a component of membrane phospholipids (Kalaiselvi and Panneerselvam 1998). Inside a sperm cell, L-carnitine transports fatty acids to the mitochondria, where they undergo beta-oxidation leading to the generation of metabolic energy needed by the sperm cells for their progressive movements (Jeulin et al. 1987). Moreover, The L-carnitine increases semen ejaculate volume /ml, sperm motility, live sperm percentage, sperm concentration and total sperm output in buck rabbits (Seleem *et al*.2006 ; El-Tohamy *et al*. 2012; Abdel-Hamed *et al*.

2014), in Friesian bulls (Abdel-Khalek *et al.* 2015) and in Boars (Lee *et al*. 2016 and Yang *et al*. 2020).

Coenzyme Q10 is a fat soluble vitamin-like substance present in every cell of the body and serves as a coenzyme for several of the key enzymatic steps in production of energy within the cell (Kapoor and Kapoor, 2013). Coenzyme Q10 plays a key role in the mitochondrial electron transport chain, and it is a critical coenzyme in the synthesis of ATP (Abdulhasan *et al*., 2015). Also, CoQ10 is an antioxidant that has great importance against free radicals (Bentinger *et al*., 2007) protects the stability of the cell membrane, DNA from free radicals induced oxidative damage and helps recycling of vitamin E and maintain healthy energy levels ((Kozink *et al*. 2004 and El-Tohamy *et al*., 2012). The Coenzyme Q10 increases semen ejaculate volume /ml, sperm motility, live sperm percentage, sperm concentration and total sperm output in buck rabbits (Eman 2019 and El-Sayed *et al*. 2019), in stallions (Nogueira 2015 and Carneiro *et al.* 2018) and human (Gvozdjáková *et al*. 2013 ; Gvozdjáková *et al*. 2015 and Salvio *et al*. 2021)

Zinc is a vital element for a multitude of body functions, including thyroid metabolism and many of other physiological processes (Baltaci *et al*. 2004). Also, zinc is involved intimately in many aspects of sperm morphology, physiology and biochemistry; although a considerable controversy exists over mechanism of action of zinc in the male reproductive system (Lord and Averill 2002). Smith and Akinbamizo (2000) indicated that more than 200 zinc dependent enzymes and hormones have been identified in all the main biochemical pathways. Hartoma *et al.* (1977) reported that zinc is a structural part of protein involved in synthesis and secretion of testosterone hormone. Spermatogenesis requires amino acids, especially arginine, methionine and cysteine (Young *et al*. 2008) and minerals Zn and Se (Cheah and Yang 2011). Mandal *et al.* (2008) found that the any supplementation with organic chelated zinc has been found more bioavailable as compared to inorganic zinc. Imam *et al*. (2009) reported that the highest values of serum testosterone and zinc levels were recorded for bulls supplemented with zinc propionate, while the lowest values were observed with the control bulls. Kumar *et al.* (2013) found that dietary Zn and Se supplementation can improve the antioxidative status and hormone levels by increasing the Zn level in blood serum and seminal plasma of goat.

Therefore, the present study aimed to evaluate the efficacy of treatment with L-carnitine, Co-enzyme Q10 and zinc-methionine on semen quality and some blood parameters for Damascus goat bucks during summer season in Egypt.

MATERIALS AND METHODS

The experimental work of the present study was carried out at El-Gemmaiza Experimental Station, Animal Production Research Institute, Agriculture Research Center, Egypt. The experimental work was initiated in June and terminated in September, 2020. Analysis of blood samples, were conducted in a private Lab., Zagazig Egypt. The objective of this study was to investigate the effects of treatment with L-carnitine, Co-enzyme Q10 and Zinc-methionine on semen quality and some blood parameters in Damascus goat bucks in summer season of Egypt.

A total number of twelve healthy Damascus goats' bucks aged 1.7-2.3 years and weighed 56.7±1.34 kg were used during summer season. The bucks were assigned to four groups (3 bucks in each group). The first group was used as a control and fed basal ration composed of 60% concentrate feed mixture (CFM) plus 20% clover hay and 20% rice straw. The 2nd group was fed basal ratio and injected with 50 mg L-carnitine/Kg live body weight twice weekly. The 3rd group was fed basal ration and injected with 6 mg Coenzyme Q10/kg live body weight twice weekly. The 4th group was fed basal ration and orally administered daily 25 mg Zinc-methionine. Composite feedstuffs samples were taken and stored for proximate analysis, according to A.O.A.C. (2016). The basal ration was formulated to meet the nutrient requirement of goat bucks according to NRC (1981). Chemical compositions of feed ingredients of the basal ration are presented in Table (1).

Animals were housed in semi open sheds under natural daylight conditions. Ambient air temperature was recorded using digital thermometer, while RH was recorded using hair-hygrometer. Index of temperature-humidity (THI) was calculated according to equation of Livestock Poultry Heat Stress Index (1990) and modified by Marai *et al*. (2000) as follows:

$$THI = dbT - [(0.31 - 0.31\ RH)\ (dbT - 14.4)]$$

Where: dbT =dry bulb temperature in Celsius (^{o}C) and RH = relative humidity/100. The obtained values of THI were classified as absence of heat stress ($\leq$ 22.2), moderate heat stress (>22.2 - $\leq$ 23.3), severe heat stress (>23.3 - $\leq$ 25.6) and very severe heat stress (> 25.6).

The bucks were allowed to drink clean fresh water *ad lib*. Vitamins and minerals blocks were available all the time to.

Semen samples were collected twice weekly over twelve weeks from 12 Damascus goat bucks with aid of an artificial vagina. Each ejaculate was taken to measure physical semen characteristics. (Ejaculate volume (ml), wave motion, progressive linear motility (%), dead spermatozoa (%), sperm concentration/ml ($x10^6$) and total sperm output($x10^6$) were investigated according to the procedures of Adams (1981) El-Gaafary (1987) and El-Kelawy (1993).

Table (1): Chemical composition of feed ingredients of the basal ration.

Item	Rice straw	Berseem hay	Concentrate feed mixture (CFM)*
DM	88.32	90.92	89.21
OM	81.25	85.65	90.85
CP	3.22	14.55	15.40
CF	40.15	26.91	14.85
EE	0.97	1.51	2.88
NFE	36.91	42.68	57.72
Ash	18.75	14.35	8.15

*CFM : Concentrate feed mix contained in percentage ; 37% yellow corn , 30% undecorticated cotton seed , 20% wheat bran, 6.5% rice bran, 3% molasses , 2.5% limestone, 1% common salt**.**

Blood samples collected regularly at 4 weeks intervals from bucks of each group, by jugular vein puncture, just before morning feeding and drinking which started before collecting semen. Harvested plasma, after centrifugation at 4000 rpm for15 minutes, was stored at – 20 °C until chemical analysis of total protein and albumin (Doumas and Biggs,1972); urea (Henry, 1965); creatinine (Bartels,1971); triglycerides (Mc Gowan *et al*., 1983) and cholesterol (Richmond, 1973). Testosterone concentration was estimated by radio-immunoassay (RIA) according to Ekins (1984). Also, cortisol hormones were evaluated by RIA procedure using the coated tubes kits purchased from (Diagnostic Products Corporation, Los Angeles, CA, USA) according to the procedure outlined by manufacturer. Enzyme activity of aspartate (AST) and alanine (ALT) transaminases (Reitman and Frankel, 1957) were estimated using commercial kits by calorimetric determination of plasma.

Individual hair temperature, skin temperature, rectal temperature, pulse rate (PR) and respiration rate (RP) as a physiological measurements of goat bucks were recorded once weekly through the experimental period. Hair temperature, skin temperature and rectal temperature were measured by digital thermometer. Counts of pulse rate (number of pulses/min) and respiration rate (number of breaths/min) were estimated using stop watch.

Statistical analysis:

Least Square Maximum Likelihood method of analysis (SPSS, Statistics Users Guide, Version 21) was used to analyze the obtained data according to Snedecor and Cochran(1982) using the formula:

$$Yij = \mu + Ti + eijk$$

Where: Yij is any observation, μ is the overall mean of observation, Ti is the effect of treatment and eijk is the random error.

The differences between LSM (least square means) were analyzed by Duncan's New Multiple Range test (Duncan, 1955).

RESULTS AND DISCUSSION

THI values of the experimental period:

Data of ambient air temperature (^{o}C), relative humidity (%) and temperature humidity index (THI) showed that animals during the experimental periods from July to September months were severe heat stress condition (Table 2) according to equation of Marai *et al*.(2002).

Table 2: Ambient temperature (°C), relative humidity (RH %) and temperature humidity index (THI) during the experimental period.

Experimental period	Treatments			Status of heat stress
	Ambient temperature (°C)	Relative humidity (%)	THI	
July	37.5	56	24.56	Severe heat stress
August	38.5	55	25.25	Severe heat stress
September	34.9	55	23.62	Severe heat stress
Mean	**36.97 ±1.07**	**55.33±0.33**	**24.48±0.48**	**Severe heat stress**

Physical semen characteristics

Results of physical semen characteristics (ejaculate volume (ml), wave motion (Score), sperm motility (%), dead spermatozoa (%), abnormal spermatozoa (%), sperm concentration/ml (x10^6/ml) and total sperm output (x10^6)) for Damascus goats bucks treated with L-carnitine, Coenzyme Q10 and Zinc-methionine are presented in Table 3.

Data in Table 3 show that administration of L-carnitine, Coenzyme Q10 and Zinc-methionine significantly (P<0.01) improved semen quality of Damascus goats bucks. Ejaculate volume (ml), wave motion, sperm motility (%), sperm concentration (x10^6/ml) and total sperm output (x10^6) were increased, while dead spermatozoa (%) and abnormal spermatozoa (%) were decreased in semen of bucks given L-carnitine, Coenzyme Q10 and Zinc-methionine compared to those of the control one. However, the goats bucks injected with 50 mg L-carnitine/Kg live body weight showed the best values of physical semen characteristics as compared to goats injected with 6 mg Coenzyme Q10/ kg live body weight or those administered 25 mg Zinc-methionine.

Table 3: Physical semen characteristics of Damascus goat bucks treated with L-Carnitine, Coenzyme Q10 and Zinc methionine during summer season.

Traits	**Treatments**				
	Control	**L-Carnitine**	**Coenzyme Q10**	**Zinc methionine**	**Sig**
Ejaculate Volume (ml)	1.26^{d} ±0.03	1.93^{a} ±0.03	1.53^{c} ±0.03	1.80^{b} ±0.027	**
Wave motion (Score)	3.36^{d} ±0.07	4.73^{a} ±0.06	3.86^{c} ±0.08	4.33^{b} ±0.08	**
Sperm motility (%)	50.68^{d} ±2.12	84.55^{a} ±0.78	68.26^{c} ±1.76	78.41^{b} ±1.35	**
Dead spermatozoa (%)	17.94^{a} ±0.38	10.23^{d} ±0.22	13.53^{b} ±0.32	11.24^{c} ±0.24	**
Abnormal spermatozoa (%)	16.73^{a} ±0.49	10.00^{d} ±0.22	12.65^{b} ±0.25	10.76^{c} ±0.25	**
Sperm concentration ($x10^{9}$/ml)	3.489^{d} ±0.55	4.76^{a} ±0.49	3.97^{c} ±0.70	4.24^{b} ±0.73	**
Total sperm output ($x10^{9}$)	4.39^{d} ±0.12	9.17^{a} ±0.17	6.07^{c} ±0.16	7.61^{b} ±0.16	**

Means in the same raw within the same classification with different letter, differ significantly ($P<0.05$).
** = ($P \leq 0.01$)

Narasimhaiah *at al*. (2018) found that goat bucks fed a diet supplemented with organic-zinc had higher sperm concentrations, higher ($P<0.01$) sperm livability, more motility and velocity compared to those fed basal diet only the control. Moreover, Liu *et al*. (2020) observed that 40 mg Zn/kg DM (zinc sulfate) in Cashmere goats during the breeding season increased the semen volume and total sperm output compared to those of the control. Similarly, the results obtained by Abdel-Khalek *et al*. (2015) showed significant ($P<0.05$) increase in ejaculate volume, sperm motility, live sperm percentage, sperm concentration and total sperm output of Friesian bulls orally administered daily of free L-carnitine at level of 2 g/head /day for 3 months for 3 months. Also, Ghorbani *et al.* (2018) found that rams fed diet supplemented with zinc during 120 days improves ejaculate volume, sperm motility, live sperm percentage, sperm concentration and total sperm output during the breeding season. Also, Abdel-Hamed *et al.* (2014) recorded significant ($P<0.05$) increase in ejaculate volume, sperm motility, live sperm percentage, sperm concentration and total sperm output of buck rabbits treated with L-

Carnitine at a dose of 140 mg/kg. Also, El-Nattat *et al.* (2011) and El-Tohamy *et al.* (2012) found that oral administration of coenzyme Q10 at a dose of 10 mg/kg increased semen ejaculate volume /ml, sperm motility, live sperm percentage, sperm concentration and total sperm output of New Zealand White (NZW) buck rabbits. Moreover, Eman (2019) found that semen ejaculate volume /ml, sperm motility, live sperm percentage, sperm concentration and total sperm output showed a significant ($P<0.05$) increase with injection of buck rabbits with Coenzyme Q10 compared to the control.

One the other hand, El-Hawary *et al.* (2018) found that feeding the Frisian bulls a diet with zinc-methionine at a level of 4 mg/kg of BW/day during two preliminary months and three main semen collection months improves ejaculate volume, sperm motility, live sperm percentage, sperm concentration and total sperm output under hot summer conditions in Egypt.

Physiological response:

Data of thermoregulatory parameters (hair temperature, skin temperature, rectal temperature, pulse rate (PR) and respiration rate (RP) of Damascus goats bucks treated with L-carnitine, Coenzyme Q10 and Zinc-methionine are presented in Table 4.

Hair, skin and rectal temperatures were significantly ($P< 0.05$) decreased in goats bucks treated with L-carnitine, Coenzyme Q10 and Zinc-methionine compared to the control group, reflecting the highest physiological response of goat bucks to L-carnitine and coenzyme Q10 under hot summer conditions in Egypt. Values of pulse rate (beat/min) and respiration rate (beat/min) were not significantly affected by treatment with L-carnitine, Coenzyme Q10 and Zinc-methionine.

Abdel-Khalek *et al.* (2015) indicated that farm animals undergo from heat stress when they expose to high environmental temperature through summer months, especially during June, July and August.

These results are in agreement with those obtained by Ayyat *et al*. (2021) who found that the supplementing the diet of New Zealand White rabbits with L-carnitine at the level of 50 mg/Kg diet significantly decreased rectal physical semen characteristics, body temperature, heart rate, and respiration rate. Also, Khalifa *et al.* (2011) reported similar physiological response of buffalo cows treated with zinc methionine under hot environmental conditions during June, July and August months in Egypt.

Table 4: Physiological parameters of Damascus goat bucks treated with L-Carnitine, Coenzyme Q10 and Zinc methionine during summer season.

Treatments					
Thermoregulatory parameters	**Control**	**L-Carnitine**	**Coenzyme Q10**	**Zinc-methionine**	**Sig**
Rectal temperature (^{0}C)	39.33^a ±0.09	39.00^b ±0.084	39.05^b ±0.08	39.19^{ab} ±0.09	*
Hair temperature (^{0}C)	35.82^a ±0.10	35.57^b ±0.09	35.56^b ±0.08	35.65^{ab} ±0.09	*
Skin temperature (^{0}C)	37.50^a ±0.09	37.23^b ±0.09	37.17^b ±0.08	37.29^{ab} ±0.09	*
Pulse rate (beat/min)	74.25 ±0.29	74.19 ±0.31	73.83 ±0.31	74.36 ±0.29	**NS**
Respiration rate (beat/min)	25.25 ±0.29	25.71 ±0.29	25.32 ±0.25	25.17 ±0.27	**NS**

NS = Not significant and * = ($P \leq 0.05$)
Means in the same raw within the same classification with different letter, differ significantly ($P<0.05$).

Blood biochemical parameters:

Data in Table 5 show that Most of blood biochemical parameters with the exception of AST, Testosterone and cortisol levels were not affected significantly by administration of L-carnitine, Coenzyme Q10 and Zinc-methionine. Goat bucks injected with 50 mg L-carnitine/Kg live body weight recorded the lowest values of AST and the highest values of testosterone as compared with the other groups. However, the goats bucks injected with Coenzyme Q10 6 mg/ kg live body weight recorded the highest value of cortisol as compared with the other groups.

Similar results were obtained by Kala *et al.* (2016) who showed that supplementation of 40 ppm of Zn from zinc methionine in the diet of kids increase of testosterone level the in blood serum. Also, Liu *et al.* (2015) showed that the testosterone concentration was higher ($P < 0.05$) in goats fed diet supplemented with 40 or 80 mg Zn/kg DM compared with those fed on basal diet only. Moreover, El-Hawary *et al.* (2018) concluded that

Table 5: Biochemical blood parameters of Damascus goat bucks treated with L-Carnitine, Coenzyme Q10 and Zinc methionine during summer season.

Items	Treatments				Sig
	control	L-Carnitine	Coenzyme Q10	Zinc-methionine	
Total protein(mg/dl)	6.04 ±0.10	6.24 ±0.17	6.02 ±0.13	6.00 ±0.14	NS
Albumin (mg/dl)	3.86 ±0.15	3.93 ±0 .17	3.74 ±0.16	3.93 ±0.14	NS
Globulin (mg/dl)	2.15 ±0.12	2.32 ±0.15	2.22 ±0.12	2.07 ±0.13	NS
A/G ratio	1.86 ±0.16	1.80 ± 0.23	1.78 ±0.18	1.99 ±0.20	NS
Cholesterol (mg/dl)	39.89 ± 1.85	37.00 ± 3.01	38.11 ± 2.44	45.39 ± 6.13	NS
Triglyceride (mg/dl)	23.44 ±1.62	28.11±11.53	19.89 ±1.81	19.78 ±1.56	NS
ALT (IU/L)	15.78 ±0 .83	15.00 ±0.76	15.56 ±0.65	16.44 ±0.88	NS
AST (IU/L)	57.11^{ab}±2.93	47.22^{b}±2.98	50.89^{ab}±3.02	57.56^{a}±3.14	*
Urea(mg/dl)	39.44 ±1.17	40.44 ±1.46	39.33 ±0.75	39.33 ±3.03	NS
Creatinine (mg/dl)	0.80 ±0.03	0.90 ±0.08	0.93 ±0.05	0.94 ±0.04	NS
Testosterone(ng/mL)	4.43^{c}±1.03	12.85^{a}±1.65	8.36^{b}±1.39	8.90^{b}±1.63	**
Cortisol (mg/dl)	9.29^{ab}±1.67	7.58^{b}±0.58	11.16^{a}±1.66	8.03^{b}±0.98	*

NS = Not significant, ***** = ($P \leq 0.05$) and ****** = ($P \leq 0.01$)
Means in the same raw within the same classification with different letter, differ significantly ($P<0.05$).

treating the Frisian bulls with zinc-methionine at a level of 4 mg/kg of BW/day showed an increase of testosterone in blood serum, while cortisol level decreased in blood plasma as compared to control one under hot summer conditions in Egypt.

Abdel-Hamed *et al.* (2014) indicated that significant ($P<0.05$) increase in serum testosterone of buck rabbits fed L-Carnitine at a dose of 140 mg/kg body weight as compared to the control group. On the other hand, Hamad *et al.* (2016) found that rabbits group treated with Coenzyme Q10 did not affect the concentration of total proteins (TP), albumin (AL), creatinine (CR), urea (UR), cholesterol (CH) and triglycerides (TG) concentrations and ALT activity in blood serum. Also, Sobhanirad and Naserian (2012) found no difference in biochemical parameters of cow serum (aminotransferase (AST), Alanine aminotransferase (ALT) total protein (TP), albumin (AL), creatinine (CR), urea (UR), cholesterol (CH) and triglycerides (TG) fed diet

supplemented with zinc-methionine. Moreover, El-Hawary *et al.* (2018) concluded that Frisian bulls given in the diet zinc-methionine at a level of 4 mg/kg of BW/day showed the lowest ($P<0.05$) activity of aminotransferase (AST), Alanine aminotransferase (ALT). However, the treatment does not affect total proteins (TP), albumin (AL) and globulin (GL) as compared to the control one under hot summer conditions of Egypt.

CONCLUSION

From the present study, it could be conclude that injection of goat bucks with L-carnitine at level of 50 mg /Kg body weight or CoQ10 at level of 6 mg /Kg body weight or orally administration of zinc methionine supplementation at level of 25 mg/head /day improve their semen quality and maintain their health status and protect them from heat stress during summer season of Egypt. The best results were obtained by treatment with L-carnitine. More studies are required to support such results.

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تأثير المعاملة بال_ كارنتين ، كوإنزيم كيو10 والزنك ميثيونين كمنشطات على جودة السائل المنوى وبعض مؤشرات الدم فى ذكور الماعز الدمشقى خلال فصل الصيف فى مصر.

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أجريت هذة الدراسة على 12 ذكر من الماعز الدمشقى عمر 1,7 – 2,3 سنة بمتوسط وزن 56,7كجم ±1,34 كجم لدراسة تأثير المعاملة بال – كارنتين ، كوإنزيم كيو10 والزنك ميثيونين كمنشطات للجسم على جودة السائل المنوى وبعض مؤشرات الدم فى ذكور الماعز الدمشقى خلال فصل الصيف فى مصر.

قسمت ذكور الماعز الدمشقى إلى أربعة مجاميع (كل مجموعة 3 ذكور).

المجموعة الاولى: أعطيت عليقة قاعدية (المقارنة) تتكون من 60% مخلوط علف مركز+20 % دريس برسيم+20 % قش أرز. كونت العليقة القاعدية وفقا للإحتياجات الغذائية المقررة لذكور الماعز طبقا لمقررات NRC عام 1981.

المجموعة الثانية: العليقة القاعدية + الحقن بـ ال-كارنتين (50 مليجرام/ كجم وزن حى مرتين إسبوعيا).

المجموعة الثالثة: العليقة القاعدية + الحقن بـ كوانزيم كيو10 (6مليجرام/ كجم وزن حى مرتين إسبوعيا).

المجموعة الرابعة: العليقة القاعدية + التجريع بـ الزنك ميثيونين (25مليجرام / رأس/ يوم).

أظهرت النتائج مايلى:

1- حدث تحسين معنوى (على مستوى إحتمال 0.01) فى جودة السائل المنوى فى ذكور المجموعات المعاملة بكلامن ال – كارنتين ، كوإنزيم كيو10 والزنك ميثيونين مقارنة بذكور مجموعة المقارنة. حيث أظهرت الذكور المحقونة بال- كارنتين أفضل النتائج للخصائص الطبيعية للسائل المنوى مقارنة بالمجموعة المحقونة بـالكوانزيم كيو10 والمجموعة المعاملة بـالزنك ميثيونين 25مليجرام / رأس/ يوم.

2. إنخفاض درجة حرارة الجلد ، الشعر والمستقيم فى ذكور الماعز الدمشقى المعاملة بـال – كارنتين ، الكوإنزيم كيو10 والزنك ميثيونين مقارنة بمجموعة المقارنة.

ومع ذلك لم يتأثر معدل النبض والتنفس معنويا بـال – كارنتين ، الكوإنزيم كيو10 والزنك ميثيونين.

3. لم تؤثر المعاملات بـال-كارنتين ، الكوإنزيم كيو10 والزنك ميثيونين معنويا على معظم صفات الدم البيوكيميائية بإستثناء الـ AST ، هرمون التستستيرون والكورتيزول حيث أظهر تأثير معنوى (على مستوى إحتمال 0.01 و 0.05).
4. الحقن بـال-كارنتين أعطى أقل مستوى بالنسبة لـ AST وأعلى مستوى لهرمون التستستيرون مقارنة بالمجاميع الاخرى. فى حين سجلت المجموعة المحقونة بالكوانزيم كيو10 أعلى مستوى لهرمون الكورتيزول مقارنة بالمجاميع الاخرى.

التوصية :

نستخلص من هذة الدراسة أن حقن ذكور الماعز الدمشقى بـــــ ال-كارنتين بمعدل 50 مليجرام/ كجم وزن حى أو كوانزيم بمعدل 6 مليجرام/ كجم وزن حى أو تجريع الزنك مثيونين بمعدل 25مليجرام / رأس/ يوم يؤدى الى تحسين جودة السائل المنوى ويحافظ على الحالة الصحية ويحمى ذكور الماعز الدمشقى من الاجهاد الحرارى خلال فصل الصيف الحار فى مصر.