



**SEMEN QUALITY AND HEMATOLOGICAL PARAMETERS OF
SINA COCKS FED ATRIPEX NUMMULARIA LEAVES MEAL
UNDER DESERT CONDITIONS**

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ABSTRACT: This study aimed to investigate the effect of using different levels of Atriplex nummularia leaves meal (ALM) on semen quality, some blood parameters and hormonal aspects of Sina cocks under South Sinai conditions. A total number of 36 Sina cocks aged 22 weeks were used. Cocks were randomly separated into four equal groups. The 1st group was fed a basal diet as a control (0 % ALM), while, the 2nd, 3rd and 4th groups were fed diets comprising 4, 8 and 12 % ALM, respectively.

The result revealed that cocks fed dietary 12 % ALM exhibited decrease ($P<0.05$) in ejaculate volume, sperm concentration, total sperm output, sperm motility, total motile sperm, semen quality factor and hydrogen ion (pH) compared to control group. Moreover, cocks fed dietary 12 % ALM showed decreased ($P<0.05$) the values of Red blood cells, hemoglobin and mean corpuscular hemoglobin concentration concentrations as compared to control diet. However, cocks fed dietary 12 % ALM showed significantly increased mean corpuscular volume as compared to other fed dietary 0, 4 and 8 % ALM. Albumin, cholesterol, triglycerides, alanine transaminase (ALT) and aspartic transaminase (AST) levels decreased ($P<0.05$) when birds fed dietary 12 % ALM, however, this diminishing was ($P>0.05$) between all other levels of ALM compared with the control diet. Potassium, chloride and calcium levels were higher ($P<0.05$) for birds fed 12 % ALM compared with the control diet. However, phosphorus level was lower in the cocks fed dietary all levels of dietary ALM compared to cocks fed control diet. However, the differences was significantly ($P<0.05$) only at the level of 12 % ALM. Aldosterone and tri-iodothyronine hormones were decreased ($P<0.05$) in the cocks fed 12 % ALM than that of control group. In conclusion, under South Sinai conditions, Atriplex nummularia leaves meal could be utilized safely in Sina cocks diet up to 8 % without adverse or serious effects on the semen quality characteristics and some blood constituents.

Key words: Atriplex nummularia leaves, hematological parameters, semen quality, Sina cocks.

INTRODUCTION

Atriplex nummularia an ever green shrub, widely circulated and refined in Egypt along the Mediterranean zone (El-Shaer, 2005 and Shawket and Ibrahim, 2013). *Atriplex* so called is identified to be tolerant to drought and salinity. It is high in crude protein, crude fiber and ash but relatively low in carbohydrates (El-Shaer, 2004 and Ben salem et al., 2005). South Sinai is hyper arid region with salt affected natural resources. So, feed resources in the area are that represent one of the main obstacles for animal production development in the area. *Atriplex nummularia* has great potentialities since it is known to be tolerant to salinity (El Shaer, 2010). However, it is poor in energy and around 65% of nitrogen is non- protein nitrogen. The high salt level in *Atriplex* limits its intake and digestion (Hassan, 2009). Also *Atriplex* species contain some secondary metabolites as condensed tannins which may restrict feed intake and lead to a negative impact on animal performance (Mansoori and Acamovic, 1997 and Ben Salem et al., 2010).

Hematological parameters and minerals are changed by drinking saline water (Fayez et al., 1994). The deleterious effect of saline water on blood constituents and reproductive performance of cocks were restricted researches (Hadziosmanovic et al., 1997). The assessment of semen characteristics of poultry gives an excellent indicator of their reproductive potential and has been reported to be a chief determinant of fertility and subsequent hatchability of eggs (Peters et al., 2004). An increased percentage of morphologically modified sperm cells may result in impaired fertility (Saacke et al., 2000). A decrease

in fertility and the occurrence of pathological sperm cells may be markedly influenced not only by chemical and physical factors but also, and above all, by stress, salinity and age of males (Jarinkovičova et al., 2012). Salinity and heat stress are a problem commonly found in Egypt. Several researchers described that salinity and heat stress led to unsafe effects on hematological parameters and semen quality (Sturkie, 1986; Mashaly et al., 2004; Morsy et al., 2012; Amal, 2013 and Abd El-Galil et al., 2014).

Afraid studies were troubled with the effect of *Atriplex nummularia* leaves meal on the blood components and semen quality of cocks. Abd El-Galil and Khidr (2001) used successively and safety of the formulate diet for rabbits to include *Atriplex nummularia* leaves meal up to 25 % without unfavorably affecting their performance. Under arid conditions, we can be used up to 8 % *Atriplex nummularia* leaves meal as a source of substitute feed resources of laying hens without adverse effects on physiological and productive performance (Abd El-Galil et al., 2014). Under South Sinai conditions, natural saline water (6000 ppm TDS) could not tolerate by cocks as directed by negative effects shown on blood constituents and semen quality, conversely, no toxic effect was found with using saline water that contain 2000 or 4000 ppm TDS (Amal, 2013). Then, this study designed to the effect of using different levels of *Atriplex nummularia* leaves meal on semen quality, hemato-biochemical parameters, hormonal aspects and mineral parameters of Sina cocks under South Sinai conditions.

MATERIALS AND METHODS

The present study was carried out at South Sinai Experimental Research

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Station (Ras-Suder City) which fits to the Desert Research Center. This experiment was started from June to September 2012 and aimed to the effect of using different levels of *Atriplex nummularia* leaves meal on semen quality, hemato-biochemical parameters, hormonal aspects and mineral parameters of Sina cocks under South Sinai conditions.

A total number of 36 Sina cocks aged 22 weeks and body weight of 1956.7 ± 29.0 g were used until 34 week of age. Cocks were randomly divided into four equal groups (9 cocks of each). The 1st group was fed a basal diet (0 % of *Atriplex nummularia* leaves meal) as a control group, whereas, the 2nd, 3rd and 4th groups were fed diets containing 4, 8 and 12 % *Atriplex nummularia* leaves meal, respectively.

The diets (Table 1) were formulated in granular form according to NRC (1994) and were iso-nitrogenous (16 % CP) and iso-caloric (2700 kcal ME/kg). Feed was presented ad libitum and fresh water was available.

The proximate chemical analysis of *Atriplex nummularia* leaves and mineral content were 20.1 % crude protein, 4.01 crude fiber, 18.4 % ash, 0.89 % magnesium, 1.5 % calcium, 0.35 % phosphorus, 2.9 % sodium, 3.5 % potassium, 20.4 ppm iron, 26.5 ppm copper, 51.8 ppm zinc and 75.0 ppm manganese.

All groups were reared under hot month's condition. Indoor maximum ambient temperature, relative humidity and temperature-humidity index were 36.7 °C, 25.5 % and 31.4, respectively.

Cocks were exposed to natural day-light and provided with artificial light to increase the day light length until reaching 16 h/day and it kept constant until the end of experiment. Birds were

kept under the same managerial and hygienic conditions. Cocks were healthy and observed against diseases and treated with antibiotics and vaccines.

Semen was collected from 8 cocks / group which randomly selected using the massages method. The ejaculate volume was determined to the nearest 0.01 ml using tuberculin syringe. Sperm concentration was determined by using Thomes–Zeis haemocytometer (Kalamah et al., 2000). Total sperm output was calculated by multiplying ejaculate volume and spermatozoa concentration. Percentage of live and abnormal sperms were determined after staining with eosine and nigrosine (Blom, 1950), then calculated as a percentage out of randomly chosen 100 sperm counted. Percentage of motile sperm was estimated a phase-contrast microscope (Melrose and Laing, 1970). Total number of motile sperm (TMS) calculated by multiplying percentage of motile sperm and total sperm output. Semen quality factor (SQF) = sperm concentration \times ejaculate volume \times live spermatozoa / 100. Hydrogen ion concentration (pH) of semen was determined directly after collection using pH paper.

Blood samples were randomly withdrawn from the wing vein into tube containing EDTA to examine immediately red blood cells counted in blood under the microscope by means of hemocytometer and hemoglobin concentration according to Jaime (2000). Hematocrite (%) was estimated using microhematocrit tubes by wintrobe methods. Mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were calculated as follows:

MCH (in pico gram, pg) = (Hb content g/dl \times 10) / RBCs in million

MCHC (%) = (Hb content × 100) / Ht %
MCV (in femto liter, fl) = (Ht % × 10) /
RBCs in million

Plasma was collected by using centrifugation for 15 minutes at 3000 rpm and it stored at -20 °C until analysis. Total protein, albumin, cholesterol, triglycerides, alanine transaminase, aspartic transaminase, total antioxidant capacity. Serum was collected to analysis sodium, potassium, calcium, phosphorus, chloride and magnesium. All samples were determined calorimetrically by using commercial kits. Globulin was calculated by the difference between total protein and albumin.

Tri-iodothyronine, aldosterone and testosterone hormones were determined by ELISA method.

Statistical analysis was carried out using General Linear Model (GLM) procedures by SAS (2004) using simple one-way analysis of variance according to this model:

$$Y_{ij} = \mu + T_i + e_{ij}$$

Where: Y_{ij} = any observation of i^{th} cock within j^{th} group, μ = overall mean, T_i = effect of i^{th} group (i : 1-4), e_{ij} = experimental error.

Significant differences among treatment means were tested using Duncan multiple range test (Duncan, 1955).

RESULTS AND DISCUSSIONS

1. Semen quality

Table (3) demonstrated that cocks fed dietary 12 % ALM exhibited decrease ($P < 0.05$) in ejaculate volume, sperm concentration, total sperm output, sperm motility, total motile sperm, semen quality factor and hydrogen ion (pH) by 51.1, 25.6, 63.6, 18.3, 70.3, 65.2 and 2.4 %, respectively as compared to control group. However, no significant differences ($P > 0.05$) were observed between the cocks fed other dietary ALM

levels. Dead sperm and sperm abnormalities % were insignificantly ($P > 0.05$) increased in the cocks fed 12 % ALM when compared to other groups. However, testosterone hormone was insignificantly ($P > 0.05$) decreased in the cocks fed 12 % ALM by 20.8 % as compared to control group (Figure 1).

Lower semen quality in the cocks fed 12 % ALM may reflect an adverse effect of high saline content on the spermatogenic process by cause a stress on the pituitary gland and hence led to alteration in the gonadotropins releasing cells activity which controls the androgenic secretion by testes (Amal et al., 2013). Salinity may cause severe degeneration of testes tissue and aggregation of RBC'S in central vein and in the sinusoids, aggregation of lymphocytes, necrosis of tubular epithelium, severe hemorrhage, severe degeneration of the kidney tissues (Ezzat et al., 2007).

On the other hand, the cocks fed dietary 4 or dietary 8 % ALM showed no delirious effect on the semen quality traits when compared in the cocks fed dietary 12 % ALM and there were no significant differences ($P > 0.05$) between the cocks fed diets containing 8 or 4 % ALM and the cocks fed 0 % ALM (control group), indicating that the cocks fed diets containing 4 or 8 % ALM was capable to tolerate the salinity level. Where, under high saline stress conditions (12 % ALM), the electrolytes system of cocks was not capable to maintaining normal homeostasis and hence it negatively effect on semen quality characteristics (Abd El-Galil et al., 2014; Morsy et al., 2012 and Amal, 2013).

2. Hematological parameters

The results of Table (4) revealed that cocks fed dietary 12 % ALM showed decreased ($P < 0.05$) the values of RBC's ,

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Hb and MCHC concentrations as compared to others fed control diet. However, cocks fed 12 % ALM showed significantly ($P<0.05$) increased MCV as compared to diets contain 0, 4 and 8 % ALM. No significant ($P>0.05$) differences between treatments in Ht % and MCH. Also, no significant differences between the cocks fed dietaries 8, 4 and 0 % ALM in hematological parameters. This decrease in RBCs count, Hb and MCHC concentrations or increase in MCV of cocks fed salt plant 12 % ALM might be due to increased water intake that may be caused hemodilution (Assad et al., 1997; Abd El-Galil et al., 2014; Morsy et al., 2012). On the other hand, Amal (2013) reported that salt intake caused varying degrees of anhydremia resulting in an elevation of specific gravity and hematocrit value in the blood. Others researchers found a decrease in Hb of different species of farm animals fed salt plants (El-Hawy, 2013; Kawashti et al., 1983; Hussein et al., 1990 and Ibrahim, 1995).

3. Biochemical parameters

Cocks fed dietary 12 % ALM showed decreased ($P<0.05$) albumin concentration as compared to the cocks fed 0 % ALM (Table 5). However, cocks fed 12 % ALM showed insignificantly decreased ($P>0.05$) in total protein and globulin concentrations as compared to other treatments. Total protein and its fractions, albumin and globulin have a great importance as decent indicators of nutritional status (Fayed et al., 2010 and Shaker et al., 2014). It is well known that albumin is synthesized only in the liver. So the decrease in albumin concentration in the cocks of 12 % ALM might reflect practical damage of liver function (Latimer et al., 2003).

Cholesterol and triglycerides levels were significantly decreased in the diet containing 12 % ALM by 19.9 and 22.6 %, respectively as compared to 0 % ALM. These results approve with the results of Abd El-Galil et al. (2014) noted a decrease in cholesterol level as a result of high salt intake. They declared that this decrease may be triggered by the anti-nutritional factors in Atriplex nummularia leaves meal that affected lipids profile indirectly. Tannins play a deep role in lipid digestibility by complexion with fatty acids (Romero et al., 2000).

Alanin transaminase (ALT) and aspartic transaminase (AST) were significantly increased in the cocks fed 12 % ALM by 26.5 and 25.0 %, respectively than that of the control group. Activities of liver enzymes are conventionally used for diagnostic hepatic functions and damage (Lassard et al., 1986; Craig et al., 1991 and Abd El-Galil et al., 2014). This results may indicates that salt load by feeding Atriplex nummularia leaves meal (12 %) did extremely affect the liver functions and in turn the animal's health. However, no significant differences ($P>0.05$) between treatments in total antioxidant capacity (TAC) concentration.

4. Minerals parameters

Potassium level was higher ($P<0.05$) in the cocks of dietary 12 % ALM by 22.2 and 19.5 % compared with others fed diets contain 4 and 0 % ALM, respectively (Table 6). Chloride level was higher ($P<0.05$) in the cocks fed dietary 12 % ALM by 14.0 % as compared to 0 % ALM. Calcium level was significantly higher in the cocks of 12 % ALM by 33.9 % compared with 0 % group. However, phosphorus level was lower ($P<0.05$) in the cocks fed 12 % ALM by 15.0 % as compared to cocks fed control diet

(Table 6). The decreased phosphorus level may be attributed to their reciprocal reverse relationship as the increased blood calcium level resulted in increased parathyroid hormone secretion which inhibits the renal tubules reabsorption of phosphorus (Abd El-Galil et al., 2014).

However, no significant differences between treatments in sodium and magnesium levels. Also, no significant ($P>0.05$) differences between the cocks fed diets contain 8, 4 and 0 % ALM in mineral parameters. Minerals happen in body fluids and tissues as electrolytes, alarmed with the maintenance of osmotic pressure, acid–base balance, membrane permeability and tissue irritability (Milne, 1996 and Underwood and Suttle, 1999). The increase of some minerals in blood might attributed to high tannins content in *Atriplex nummularia* leaves meal were found to be worrying the absorption of minerals through the intestinal tract (Mansoori and Acamovic, 1997).

5. Aldosterone and Tri-iodothyronine hormones

Aldosterone hormone was decreased ($P<0.05$) in the cocks fed dietary 12 % ALM by 31.0 % than that of control group (Figure 2). And it insignificantly decreased in the cocks fed diets contain 4 and 8 % ALM by 6.8 and 11.1 %, respectively as compared to control group. This result may attributed to that cocks fed 12 % *Atriplex nummularia* leaves meal accomplished the physiological effects of salt retention and excretion by reducing their plasma aldosterone concentration by nearly 50 % of control values (Amal, 2003; Digby, 2007; El-Hawy, 2013; El-Bassiony, 2013 and Abd El-Galil et al., 2014).

Tri-iodothyronine hormone level was decreased in the cocks fed dietary 12 % ALM by 38.7 % as compared with

control group (Figure 3). This decrease may attributed to increase water intake and decrease feed intake which lead to hemodilution or increase in the osmotic pressure of body fluids which resulted in decrease thyroid hormones (Ahmed, 1996; Amal, 2003 and 2013; Shaker, 2014 and Abd El-Galil et al., 2014).

IN CONCLUSION,

under South Sinai conditions, *Atriplex nummularia* leaves meal could be utilized safely in Sina cocks diet up to 8 % without adverse or serious effects on the semen quality characteristics and some blood constituents.

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Table (1): Composition and calculated analysis of the experimental diets.

Ingredients (%)	Treatments			
	Atriplex nummularia leaves meal levels (%)			
	0 %	4 %	8 %	12 %
Atriplex nummularia leaves meal	0.00	4.00	8.00	12.00
Yellow corn	62.00	60.63	60.00	58.25
Soybean meal (44 % CP)	16.10	11.75	10.50	7.35
Corn gluten meal (60 % CP)	4.75	6.40	6.40	8.10
Wheat bran	6.84	7.25	5.31	4.61
Limestone ground	2.20	2.20	2.20	2.20
Dicalcium phosphate	1.70	1.70	1.70	1.70
Vit. and min. premix*	0.30	0.30	0.30	0.30
Salt	0.23	0.10	0.00	0.00
DL- methionine	0.28	0.27	0.29	0.29
Sand	5.60	5.40	5.30	5.20
Total	100	100	100	100
Calculated values**				
Crude protein	16.11	16.10	16.04	16.13
Crude fiber	3.29	3.21	3.06	2.95
Ether extract	2.81	2.85	2.91	2.99
Ash	2.37	2.80	3.39	3.89
Calculated values				
Metabolizable energy (kcal/kg)	2700	2700	2700	2700
Calcium (%)	1.25	1.26	1.27	1.28
Available phosphorus (%)	0.41	0.41	0.41	0.41
Methionine (%)	0.60	0.60	0.60	0.60
Lysine (%)	0.72	0.71	0.78	0.81
Methionine+ Cyc (%)	0.87	0.88	0.88	0.82
Cystine	0.27	0.28	0.28	0.29

* Each 2.5 kg Vitamins and minerals premix comprises (per ton of feed), Vit. A 10000000 IU, Vit. D₃ 2000000 IU, Vit.E 10g, Vit.K₃ 1000 mg, Vit. B₁ 1000 mg, Vit. B₂ 5000mg, Vit. B₆ 1.5g, Vit. B₁₂ 10 mg, Pantothenic acid 10g, Niacin 30g, Folic acid 1g, Biotin 50 mg, Iron 30g, Manganese 70g, Choline chlorite 10g, Iodine 300 mg, Copper 4g, Zinc 50g and Selenium 100 mg.

** According to NRC (1994)

Table (2): Semen quality and testosterone hormone of Sina cocks fed diets contain different levels of *Atriplex nummularia* leaves meal.

Traits	Treatments <i>Atriplex nummularia</i> leaves meal levels (%)				± SE
	0 %	4 %	8 %	12 %	
EV (ml)	0.45 ^a	0.36 ^a	0.37 ^a	0.22 ^b	0.05
SC (×10 ⁶ ml)	750.0 ^a	724.0 ^a	696.0 ^a	558.0 ^b	47.1
TSO (×10 ⁶)	337.5 ^a	260.6 ^a	257.5 ^a	122.7 ^b	51.9
SM (%)	87.0 ^a	84.0 ^{ab}	81.0 ^{ab}	71.0 ^b	6.6
TMS (×10 ⁶)	293.6 ^a	218.9 ^a	208.5 ^{ab}	87.1 ^b	52.3
LS (%)	84.4	81.2	82.8	80.8	2.4
DS (%)	16.6	18.8	18.8	19.2	2.4
SA (%)	8.6	10.2	9.2	11.6	1.4
SQF	284.8 ^a	211.6 ^a	213.2 ^a	99.1 ^b	41.3
pH	8.1 ^a	8.0 ^a	8.1 ^a	7.9 ^b	0.03

EV = ejaculate volume; SC = sperm concentration; TSO = total sperm output; SM = sperm motility; TMS = total motile sperm; LS = live spermatozoa; DS = dead spermatozoa; SA = sperm abnormalities; SQF = semen quality factor; pH = hydrogen ion; T₂ = testosterone hormone.

a, b Means with different superscript among columns are significant differences (P<0.05).

Table (3): Hematological parameters of Sina cocks fed diets contain different levels of *Atriplex nummularia* leaves meal (ALM).

Traits	Treatments <i>Atriplex nummularia</i> leaves meal levels (%)				± SE
	0 %	4 %	8 %	12 %	
RBC (×10 ⁶)	5.4 ^a	5.2 ^a	5.1 ^a	4.6 ^b	0.16
Hb (g/dl)	16.2 ^a	15.7 ^{ab}	15.0 ^{ab}	14.2 ^b	0.64
Ht (%)	45.8	44.1	45.1	45.0	0.90
MCV (fl)	84.8 ^b	84.8 ^b	88.4 ^b	97.8 ^a	3.4
MCH (pg)	30.0	30.1	29.4	30.8	2.4
MCHC (%)	35.3 ^a	35.6 ^a	33.2 ^{ab}	31.5 ^b	1.6

RBC's = red blood cells; Hb = hemoglobin; Ht = hematocrite %; MCV = mean corpuscular volume; MCH = mean corpuscular hemoglobin; MCHC = mean corpuscular hemoglobin concentration.

a, b Means with different superscript among columns are significant differences (P<0.05).

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Table (4): Biochemical parameters of Sina cocks fed diets contain different levels of Atriplex nummularia leaves meal.

Traits	Treatments Atriplex nummularia leaves meal levels (%)				± SE
	0 %	4 %	8 %	12 %	
Total Protein (g/dl)	5.6	5.5	4.9	4.2	0.69
Albumin (g/dl)	2.8 ^a	2.4 ^{ab}	2.5 ^{ab}	2.1 ^b	0.25
Globulin (g/dl)	2.4	3.1	2.4	2.1	0.63
Cholesterol (mg/dl)	109.6 ^a	96.5 ^{ab}	97.2 ^{ab}	87.7 ^b	10.6
Triglycerides (mg/dl)	236.2 ^a	227.9 ^{ab}	197.2 ^{ab}	182.7 ^b	24.7
ALT (I.U./L)	30.5 ^b	32.7 ^{ab}	33.3 ^{ab}	38.6 ^a	3.3
AST (I.U./L)	42.7 ^b	45.6 ^{ab}	47.9 ^{ab}	53.4 ^a	4.5
TAC (mM/L)	0.39	0.37	0.36	0.34	0.02

ALT = alanine transaminase; AST = aspartic transaminase; TAC= total antioxidant capacity.
a, b Means with different superscript among columns are significant differences (P<0.05).

Table (5): Mineral parameters of Sina cocks fed diets contain different levels of Atriplex nummularia leaves meal.

Traits	Treatments Atriplex nummularia leaves meal levels (%)				± SE
	0 %	4 %	8 %	12 %	
Sodium (mEq/l)	122.5	120.9	115.6	119.3	6.4
Potassium (mEq/l)	4.6 ^b	4.5 ^b	5.2 ^{ab}	5.5 ^a	0.22
Chloride (mEq/l)	61.3 ^b	64.4 ^{ab}	65.2 ^{ab}	69.9 ^a	2.2
Calcium (mg/dl)	10.6 ^b	10.0 ^b	11.7 ^b	14.2 ^a	0.67
Phosphorus (mg/dl)	5.3 ^a	5.0 ^{ab}	4.7 ^{ab}	4.5 ^b	0.34
Magnesium (mg/dl)	2.2	2.1	2.2	2.2	0.13

a, b Means with different superscript among columns are significant differences (P<0.05).

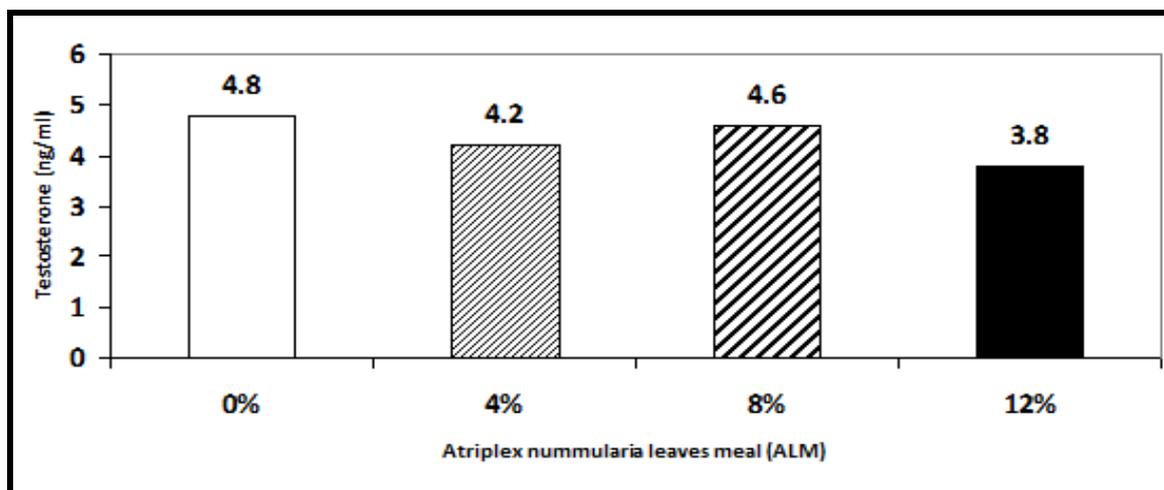


Figure (1): Testosterone hormone of Sina cocks fed diets contain different levels of Atriplex nummularia leaves meal.

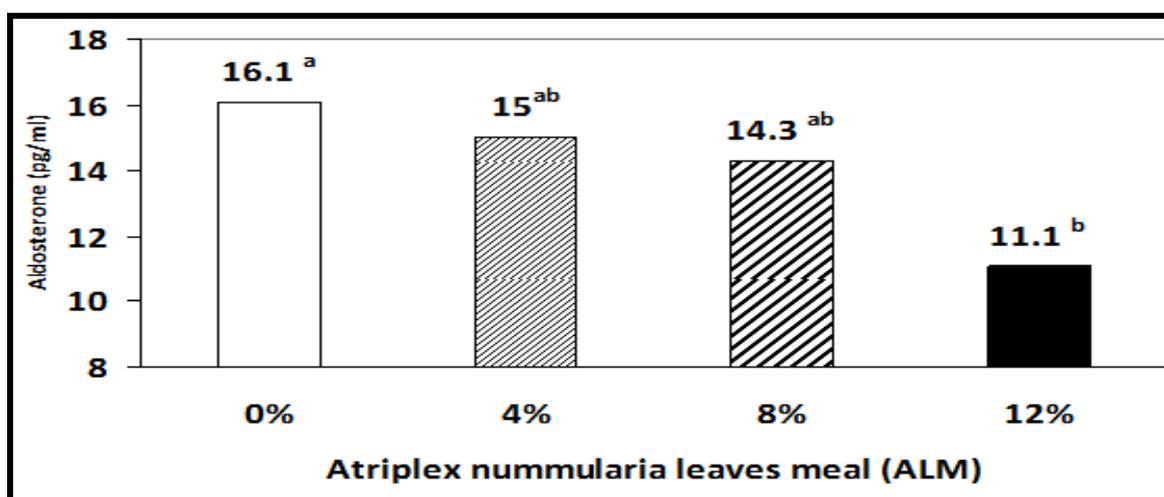


Figure (2): Aldosterone hormone of Sina cocks fed diets contain different levels of Atriplex nummularia leaves meal.

a, b. Means with different superscript in the different columns are significant differences ($P < 0.05$).

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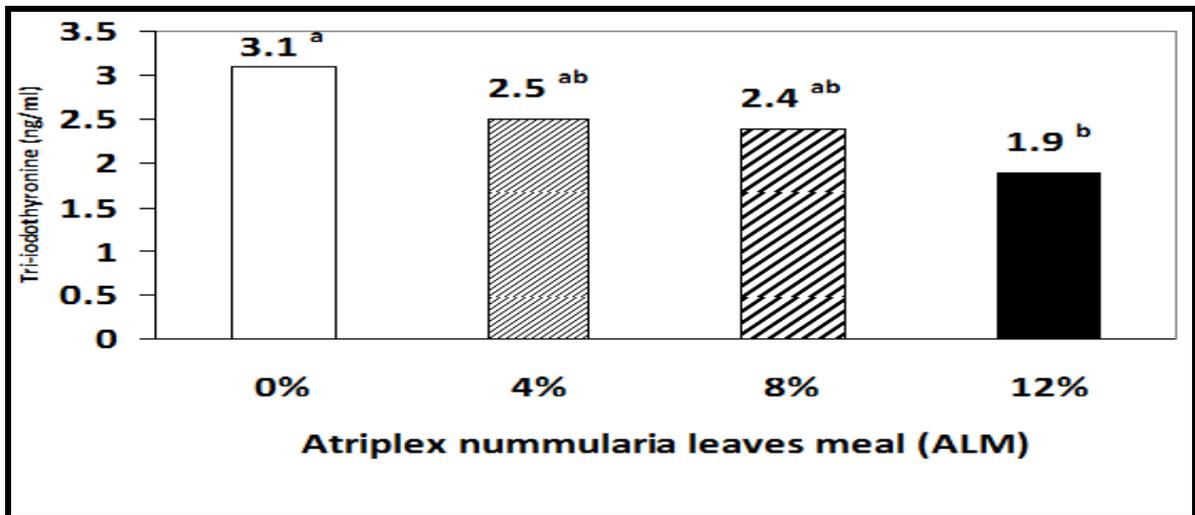


Figure (3): Tri-iodothyronine hormone of Sina cocks fed diets contain different levels of Atriplex nummularia leaves meal.

a, b. Means with different superscript in the different columns are significant differences ($P < 0.05$)

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الملخص العربي

جودة السائل المنوي وصفات الدم لديوك دجاج سينا المغذاة على مسحوق أوراق نبات القطف تحت الظروف الصحراوية

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يهدف البحث إلى دراسة تأثير استخدام مستويات مختلفة من مسحوق أوراق نبات القطف على جودة السائل المنوي ومقاييس الدم وخصائص الهرمونات لديوك دجاج سينا تحت ظروف جنوب سيناء. استخدم في هذه الدراسة عدد 36 ديك تم تقسيمهم إلى أربعة مجموعات متساوية. المجموعة الأولى غذيت على عليقة أساسية وأعتبرت كنترول (0,0) % مسحوق أوراق القطف) بينما غذيت المجموعة الثانية والثالثة والرابعة على علائق تحتوى نسب متدرجة من مسحوق أوراق القطف 4، 8، 12 % من العليقة الكلية، على التوالي.

أظهرت النتائج أن الديوك المغذاة على علائق تحتوى 12 % من مسحوق أوراق القطف انخفاض معنوي في حجم القذفة وتركيز الحيوانات المنوية والحركة وعامل جودة السائل المنوي والأس الهيدروجيني مقارنة بالمجموعة الكنترول. سجلت الديوك المغذاة على نفس العليقة السابقة انخفاض معنوي لقيم كرات الدم الحمراء والهيموجلوبين ومتوسط تركيز الهيموجلوبين مقارنة بالمجموعة الكنترول. بينما زاد معنوياً حجم خلية الدم في الديوك المغذاة على هذه العليقة المحتوية على 12 % من مسحوق أوراق نبات القطف مقارنة بالمجموعات الأخرى. كما أظهرت الديوك المغذاة على العليقة المحتوية على 12 % من مسحوق أوراق القطف زيادة معنوية في مستوى الألبومين والكولستيرول والجلسريدات الثلاثية والجلسريدات الثلاثية وأنزيمات الألائين والأسبارتك الناقله لمجموعة الأمين مقارنة بالمجموعة الكنترول. ارتفع معنوياً تركيز عنصر البوتاسيوم والكلوريد والكالسيوم في الديوك المغذاة على العليقة المحتوية على 12 % من مسحوق أوراق القطف عند المقارنة بالمجموعة المغذاة على 0 % من مسحوق أوراق القطف. انخفض معنوياً عنصر الفوسفور في المجموعة المغذاة على العليقة المحتوية على 12 % من مسحوق أوراق القطف مقارنة بالديوك المغذاة على 0 % من مسحوق أوراق القطف. انخفض معنوياً تركيزات هرمون الألدوسترون والثيرونين ثلاثي اليود في الديوك المغذاة على العليقة المحتوية على 12 % من مسحوق أوراق القطف مقارنة بالمجموعة الكنترول.

تخلص الدراسة إلى أنه تحت ظروف جنوب سيناء يمكن استخدام مسحوق أوراق القطف بأمان في عليقة ديوك دجاج سينا حتى مستوى 8 % دون تأثيرات ضارة على صفات السائل المنوي وبعض صفات الدم.