

EFFECT OF TONOPHOSPHANE AS A PHOSPHORUS COMPOUND PREPARATION ON SEXUAL DESIRE AND SEMEN QUALITY OF EGYPTIAN BUFFALO BULLS

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SUMMARY

Aim of this study was to evaluate sexual desire, physical semen characteristics, and some blood biochemical parameters of buffalo bulls injected with tonophosphane during summer season. Total of 20 sexually mature Egyptian buffalo bulls with average of 4 years of age and 600 kg live body weight were divided into 4 experimental groups (5 bulls in each). Bulls in the 1st group (G1) were served as a control and did not receive any treatment. However, each bull of those in the 2nd (G2), 3rd (G3) and 4th (G4) groups was once weekly administrated by intramuscular injection with 5, 7 and 10 ml of tonophosphane for 8 weeks (treatment period). Reaction time (RT) and scrotal circumference (SC) were recorded, semen was collected by artificial vagina and evaluated, and blood samples were taken for 12 weeks. Results showed that RT decreased ($P<0.05$), SC increased ($P<0.05$) by increasing treatment level, being the lowest in G2 and the highest in G4. All physical semen characteristic (ejaculate volume, mass and progressive motility, sperm livability, sperm cell concentration and sperm abnormality) were the best ($P<0.05$) in G4. Sperm outputs per ejaculate as total motile, live and normal sperm output per ejaculate increased ($P<0.05$) in G4. Plasma total proteins and albumin concentration increased ($P<0.05$) in treatment groups, while globulin concentration increased only in G3. By advancing collection week, RT, SC, ejaculate volume, abnormal sperm, sperm cell concentration, all sperm outputs ($P<0.05$), and mass and progressive motility ($P\leq 0.05$) improved, while live sperm decreased ($P\leq 0.05$). In conclusion, intramuscular injection with tonophosphane as a phosphorus source once weekly pre-collection of semen showed pronouncedly positive effects on sexual desire, semen quality and health status of Egyptian buffalo bulls. Tonophosphane injection at a level of 10 ml/head showed the best results.

Keywords: *buffalo, phosphorus, libido, semen quality, plasma proteins.*

INTRODUCTION

It is well known that the efficiency of reproduction of animal is markedly affected by environmental factors (ambient temperature, relative humidity and photoperiod), nutritional factors (energy, protein, vitamins and minerals) and managerial factors (Yousri 1970, Yousef, 1979; Johnson, 198). Early investigators of nutritional aspects of male fertility relied chiefly upon examination of ejaculated spermatozoa because semen may vary quantitatively and qualitatively with diet and nutritional status of the animal (Mann and Lutwok-Mann, 1981). Therefore, nutritional deficiency has long been known to exert deleterious effect on reproduction in the male.

Phosphorous (P) as a major element is the second most abundant mineral in the animal body and about 80% of total P is found in the bones and teeth. A deficiency of P leads to decline in fertility rate, feed intake, milk production, ovarian activity, irregular estrous cycles, increased occurrence of cystic ovaries, delayed sexual maturity and low conception rates (Martinez *et al.*, 2012). Phosphorous is a component of deoxy- and ribo-nucleic acids, which are essential in cell growth and differentiation. It contributes to cell-membrane fluidity and integrity as phospholipids and helps to maintain osmotic and acid-base balance as phosphate (Wang *et al.*, 1985). The requirements of caeco-colonic microflora are important, and microbial protein synthesis may be impaired on low-phosphorous diets (Perti *et al.*, 1989; Ternouth and Sevilla, 1990).

Using of butafosfan, a phosphoric acid compound, in combination with cobalamin, modulates many cellular metabolic functions in several species. Its use enhances the productive and reproductive performance and reduces stress responses in animals. The use of butafosfan and cobalamin in the stallions did not affect the seminal quality of young and fertile stallions. It can be used routinely and safely in these stallions. However, contrary to observations in humans and in bulls, the use of cobalamin did not improve

semen parameters in these stallions (Nicolás Cazales Penino *et al.*, 2015). On the other hand, Nagy (2008) recorded that weekly injection of rabbit bucks with tonyphosphane at a level of one ml/buck improved semen quality especially during summer months. Also, Gabr *et al.* (2010) found that the effect of weekly injection with 140 mg phosphorus on semen quality of rabbit bucks term of improving most physical characteristics , total sperm of motile, normal and live outputs.

Despite these attributes, so far there are no controlled studies that have evaluated the effects of phosphorus additives on seminal quality of cattle in Egypt. Therefore, the main objective of this study was to evaluate sexual desire, physical semen characteristics, and some blood biochemical parameters of buffalo bulls injected with tonyphosphane during summer season.

MATERIALS AND METHODS

The present study was conducted at the Department of animal production, Faculty of Agriculture Tanta University and El-Gemmeza Experimental station, Animal production Research Institute, Ministry of Agriculture during the period from June to October 2015.

Animals:

Total of 20 sexually mature Egyptian buffalo bulls with average of 4 years of age and 600 kg live body weight were divided into 4 experimental groups (5 bulls in each). All bulls were housed tied in 180 x 380 Cm separate houses with semi-open sheds of 4.0 meters height. Bulls in all experimental groups were exposed to the natural photoperiod and no artificial light was exercised. During treatment period of 8 weeks, bulls were treated with tonyphosphane and trained for semen collection for two months before the main semen collection period for 12 weeks.

Experimental design:

Four experimental groups (5 bulls in each) were tested in this study. Bulls in the 1st group (G1) were served as a control and did not receive any treatment. However, each bull of those in the 2nd (G2), 3rd (G3) and 4th (G4) groups was once weekly administrated by intramuscular injection with 5, 7 and 10 ml of tonophosphane (Intervet Company, Egypt) for 8 weeks (treatment period). Each ml of Tonyphosphane contained 140 mg phosphorus/ml.

Feeding and management:

A constant feeding regime was established according to the recommendations of Animal Nutrition Department (NRC,1975), Animal Production Research Institute Dokki, Egypt. Each bull was fed daily on 6.0 kg unified concentrate mixture (48% uncorticated cotton seed cake, 21.5% wheat bran, 20% maize, 4.5% rice polish, 3% molasses, 2% limestone and 1% sodium chloride), 6 kg rice-straw and 2 kg berseem hay. Also, during the course of the experiment the bulls were allowed to drink water twice daily.

Experimental procedures

Sexual desire:

During semen collection weeks, sexual interest was recorded in term of reaction time which was the time (in seconds) elapsed from approaching the bull to the teaser buffalo cow until the ejaculation was completed.

Scrotal circumference:

It was recorded for each animal using a metal scrotal tape. The testes were pulled firmly into the lower port of the scrotum by encircling its base with the hand and pulling down on the testes. The scrotal tope was farmed into a loop and slipped over the scrotum and pulled up snugly around the greatest diameter of the scrotal contents. The thumbs and fingers were located on the side of the scrotum to prevent separation of the testes and inaccurate measurement.

Semen collection and evaluation:

Semen collection was done outdoors using teaser bull and artificial vagina. Semen ejaculates were collected twice weekly for 12 weeks. On each collection day, semen volume was recorded and semen was evaluated for percentage of mass motility, progressive sperm motility, live sperm and abnormal sperm as well as sperm cell concentration. Then output per ejaculate of total, motile, live and normal spermatozoa was calculated.

Blood sampling:

Blood samples were collected weekly during the collection period immediately before feeding via jugular vein from all buffalo bulls for determination of concentration of total proteins and albumin in blood plasma using spectrophotometer (6405 UV/VIS) and commercial kits. However, concentration of globulin was computed by subtracting concentration of total proteins from albumin. Total protein and albumin concentrations in blood plasma were analyzed using commercial kits (Diagnostic System Laboratories, Inc USA according to the following Weichselbaum (1946) and Gonal *et al.* (1949), respectively.

Statistical analysis:

Data were statistically analyzed according to Snedecor and Cochran (1982) using computer program of SAS (2002). The obtained percentage values were subjected to arcsine transformation before performing the analysis of variance. Means were presented after being recalculated from the transformed values to percentages. However, the significant differences were carried out using Multiple Range Test of Duncan (1955).

RESULTS AND DISCUSSION

Effect of tonophosphane treatment on:

Sexual desire:

Data in Table (1) revealed that reaction time (RT) significantly ($P<0.05$) decreased, while scrotal circumference (SC) significantly ($P<0.05$) increased by increasing treatment level, being G2 AND G4 were the lowest and the highest, respectively, as compared with control (G1).

These results indicated improving sexual desire of buffalo bulls treated with 10 ml tonophosphane. Libido or sex drive of buffalo bulls as expressed by RT has been studied by several workers. Average value of RT of Egyptian buffalo bulls ranged between 87.80 s (Gabr 2000) and 103.34 s (El-Fouly *et al.*, 1992). Improving RT of buffalo bulls injected with tonophosphane could be suggested that phosphorous plays a vital role in a host to metabolic osmotic functions, including energy utilization and transfer via adenosine mono- (AMP), di- (ADP) and tri-phosphatase (ATP), with implications for glucogenesis, fatty acid transport, amino acid and protein synthesis and the activity of the sodium/potassium pump (Wang *et al.*, 1985). However, increasing SC measure in bulls of G4 may indicate that the SC development in buffaloes was characterized by a phase of accelerated growth following tonophosphane treatment, and the onset in the accelerated SC growth could be associated with increasing the sexual development (Marc Henery, 2013).

Table (1): Effect of tonophosphane injection on reaction time (second) and scrotal circumference of Egyptian buffalo bulls.

Item	G1 (Control)	G2 (5 ml TPh)	G3 (7 ml TPh)	G4(10 ml TPh)
Reaction time (second)	123.30±2.75 ^a	82.25±1.55 ^b	88.25±1.92 ^c	78.83±0.53 ^d
Scrotal circumference (cm)	32.10±0.92 ^c	47.01± 1.01 ^b	50.20±0.94 ^a	53.05±0.82 ^a

a, b and c: Means within the same row with different superscripts are significantly different at $P<0.05$.

Physical semen characteristics:

In relation with the results of sexual desire (Table,1) and also all physical semen characteristic ((Table, 2) of bulls G4 treated with 10 ml tonophosphane showed significantly ($P<0.05$) the best desire and semen quality, in terms of the highest ejaculate volume, percentages of mass motility, progressive motility and livability, and sperm cell concentration as well as the lowest percentage of sperm abnormality, as compared to control and other treatment groups .

The obtained improvement in semen quantity and quality of buffalo bulls treated with tonophosphane, especially at a level of 10 ml/bull (G4) was reported by Nagy (2008) rabbit (NZW rabbit bucks injected with phosphorus and also by Gabr *et al.* (2010) in NZW bucks injected with tonophosphane. However, Nicolás Cazales *et al.* (2015) noted that the use of butafosphan and cobalamine in the stallions did not

affect the volume or quality of young and fertile males. This increase in semen volume of treated group may be attributed to direct influence of abundant phosphorous on the activity of some accessory glands (seminal vesicles, prostate and Cowper's glands) or indirectly on testosterone concentration in peripheral blood, which plays an important role on function accessory sex glands (Abdel-Khalek et al., 2005). The observed improvement in sperm livability of treated groups may be related to that phosphorous affects the metabolism of testicular tissue through its active role in metabolic enzymes. Also, phosphorous is a component of deoxy- and ribo-nucleic acids, which are essential in cell growth and differentiation as phospholipids it contributes to cell membrane fluidity and integrity (Under- Wood et al., 1977). The recorded improvement in sperm abnormality as affected by phosphorous injection may be due to that phosphorus may play an important role in activation of lysosomal enzymes which might reduce the incidence of proximal and distal protoplasmic droplets and subsequently, this could enhance sperm maturation (Gabr et al., 2010). The detected increase in sperm cell concentration in treated groups may due to the role of phosphorous, as a main element in tonyphosphane (140 mg/ml), in the maintenance or activation of the testicular germinal epithelium in the seminiferous tubules. In this respect, Flerchinger and Erb (1955) showed a marked relationship between sperm concentration and total phosphorus ($r = 0.88$) in 506 semen samples collected over a 7-month period from 36 bulls of high fertility.

Table (2): Effect of tonophosphane injection on physical semen characteristics of Egyptian buffalo bulls.

Item	G1(Control)	G2 (5 ml TPh)	G3 (7 ml TPh)	G4 (10 ml TPh)
Ejaculate semen volume (ml)	2.57 ^d ±0.09	3.39 ^c ±0.08	3.92 ^b ±0.10	4.17 ^a ±0.06
Mass motility (%)	60.25 ^c ±0.28	67.4 ^b ±0.88	69.5 ^b ±0.92	74.66 ^a ±0.96
Progressive sperm motility (%)	61.08 ^c ±0.75 ^c	68.0 ^b ±0.88	70.58 ^b ±0.92	75.33 ^a ±0.96
Live sperm (%)	67.4 ^d ±0.75	73.83 ^c ±0.55	75.58 ^b ±0.92	79.25 ^a ±0.53
Abnormal sperm (%)	18.4 ^a ±0.35	13.08 ^b ±0.48	12.40 ^b ±0.42	10.5 ^c ±0.56
Sperm concentration (x10 ⁶ /ml)	506.28 ^c ±9.75	741.32 ^b ±13.88	770.4 ^a ±12.0	783.9 ^a ±10.8

a, b and c: Means within the same row with different superscripts are significantly different at P<0.05.

Concentration of total proteins and their fractions:

Results in Table (3) showed that tonophosphane treatments led to significant (P<0.05) increase in concentration of plasma total proteins and albumin, while also tonyphosphane treatment at a level of 7 ml/h (G3) significantly (P<0.05) increased globulin plasma concentration in blood of bulls.

The obtained values of total proteins concentration are within the normal range in blood plasma of buffaloes, ranging from 6.45 g/dl (Abd-Ellah (2011) to 8.18 g/dl (Abd-Ellah et al., 2013). The present values of albumin concentration are slightly higher in treatment groups and within the normal range (3.3-3.8 g/dl) in control one (Abdel-Hakim et al., 2002; Osman et al., 2002; Abel-Samee et al., 2003), while the present results of globulin concentration are lower than a range of 3.16-4.89 g/dl as reported by Gad Alla (2001); Abdel-Hady (2001). Such results may suggest effect of phosphorus treatment on increasing total proteins concentration as a result of increasing albumin rather globulin concentration. In agreement with the present results, Nagy (2008) and Gabr et al. (2010) found that total proteins concentration in blood plasma significantly increased in rabbit bucks treated with phosphorus compared with control bucks. The pronounced increase in total proteins concentration in buffalo bulls treated with tonyphosphane may be related to that phosphorous plays a vital role in amino acid and protein synthesis during metabolism (Wang et al., 1985).

Table (3): Effect of tonophosphane injection on concentration of total proteins and their fraction in blood plasma of Egyptian buffalo bulls.

Concentration (g/dl)	G1 (Control)	G2 (5 ml TPh)	G3 (7 ml TPh)	G4 (10 ml TPh)
Total proteins	6.31 ^c ±0.10	6.60 ^b ±0.09	6.95 ^a ±0.08	7.01 ^a ±0.10
Albumin	3.67 ^c ±0.10	4.06 ^b ±0.09	4.11 ^b ±0.08	4.32 ^a ±0.06
Globulin	2.62 ^b ±0.05	2.55 ^b ±0.07	2.84 ^a ±0.06	2.69 ^{ab} ±0.06

a, b and c: Means within the same row with different superscripts are significantly different at P<0.05.

Effect of collection week on:

Sexual desire and physical semen characteristics:

As affected by collection week of semen, RT, SC, ejaculate volume, percentage of abnormal sperm and sperm cell concentration significantly ($P<0.05$) improved by advancing semen collection week. However, percentage of mass motility and progressive motility insignificantly improved, while percentage of live sperm insignificantly decreased by advancing collection week (Table, 4).

It is of interest to note that decreasing RT significantly ($P<0.05$) was associated with significant ($P<0.05$) increase in SC, ejaculate volume and sperm cell concentration. Increasing sexual desire in term of decreasing RT, may be associated with increasing testosterone concentration, and also increasing SC may be associated with increasing testicular volume, each or both may be responsible for increasing ejaculate volume and sperm cell concentration (Abdel-Khalek et al., 2005).

Table (4): Effect of semen collection week on reaction time, scrotal circumference and physical semen characteristics of Egyptian buffalo bulls.

Week	RT(s)	SC (cm)	EV (ml)	MM (%)	PM (%)	LS (%)	AS (%)	SCC ($\times 10^6/\text{ml}$)
1	87.50 ^b ±3.2	37.3 ^c ±0.12	2.92 ^c ±0.08	64.8 ±1.1	65.0 ±2.5	77.8 ±1.5	15.5 ^b ±1.3	629.9 ^c ±15.3
2	86.25 ^b ±4.5	39.8 ^c ±0.13	2.95 ^c ±0.06	66.3 ±2.3	68.0 ±3.1	72.8 ±2.3	17.0 ^a ±1.6	641.8 ^b ±18.4
3	98.25 ^a ±6.1	38.5 ^c ±0.17	2.95 ^c ±0.05	62.5 ±1.7	64.3 ±2.4	78.0 ±3.1	19.0 ^a ±1.4	685.2 ^b ±20.5
4	99.00 ^a ±3.7	42.9 ^b ±0.1	2.72 ^c ±0.06	66.8 ±1.9	67.0 ±2.4	80.3 ±4.2	18.5 ^a ±1.3	711.7 ^a ±21.2
5	87.00 ^b ±6.2	45.5 ^{ab} ±0.1	3.25 ^b ±0.08	66.0 ±2.1	66.3 ±1.4	75.0 ±3.5	15.5 ^b ±1.5	689.3 ^b ±13.8
6	101.0 ^a ±7.1	44.2 ^{ab} ±0.1	3.54 ^b ±0.01	66.5 ±2.4	67.3 ±1.3	70.5 ±2.3	13.3 ^b ±2.1	713.3 ^a ±14.8
7	90.00 ^a ±3.8	48.5 ^a ±0.14	3.80 ^b ±0.07	66.8 ±2.5	67.8 ±1.2	71.8 ±2.1	11.5 ^c ±1.8	711.7 ^a ±16.9
8	97.50 ^a ±2.5	48.7 ^a ±0.17	3.90 ^a ±0.09	71.0 ±1.8	71.5 ±2.2	71.8 ±3.2	11.8 ^c ±1.6	738.5 ^a ±20.8
9	103.3 ^a ±5.6	48.5 ^a ±0.15	4.05 ^a ±0.1	71.8 ±1.3	71.8 ±1.1	71.3 ±1.4	11.3 ^c ±1.8	718.3 ^a ±23.7
10	95.00 ^a ±3.3	48.3 ^a ±0.13	3.91 ^a ±0.09	72.8 ±1.5	72.8 ±1.5	73.3 ±2.3	10.0 ^c ±1.6	718.6 ^a ±26.1
11	87.00 ^b ±4.7	46.8 ^a ±0.19	3.92 ^a ±0.1	70.5 ±1.5	72.3 ±2.4	73.8 ±2.1	10.0 ^c ±1.9	732.4 ^a ±27.6
12	86.25 ^b ±5.6	50.5 ^a ±0.1	4.27 ^a ±0.06	70.0 ±1.9	71.3 ±1.6	72.3 ±3.4	10.0 ^c ±1.9	715.5 ^a ±28.5

a, b and c: Means within the same column with different superscripts are significantly different at $P<0.05$.

RT: Reaction time. SC: Scrotal circumference. EV: Ejaculate volume. MM: Mass motility. PM: Progressive motility. LS: live sperm. AS: Abnormal sperm. SCC: Sperm cell concentration.

Sperm output and protein metabolites:

As affected by collection week of semen, sperm outputs as total, motile, live and normal per ejaculate significantly ($P<0.05$) increased by advancing semen collection week. These increases were attributed to increasing ejaculate volume and improving semen quality by advancing collection week. However, concentration of albumin increased and globulin concentration decreased significantly ($P<0.05$), reflecting insignificant change in total proteins concentration by advancing collection week of semen (Table 5).

Table (5): Effect of semen collection week on sperm output/ejaculate and blood proteins of Egyptian buffalo bulls.

Week	Sperm output (x10 ⁶ /ejaculate)				Blood plasma concentration (g/dl)		
	Total	Motile	Live	Normal	T. proteins	Albumin	Globulin
1	1857.4 ^c ±70.2	1223.4 ±55.2 ^c	1449.0 ^b ±33.5	1774.6 ^b ±64.3	6.59 ±0.10	3.74 ^b ±0.05	2.85 ^a ±0.05
2	1927.8 ^c ±77.4	1324.7 ±62.4 ^c	1412.2 ^b ±35.1	1612.5 ^b ±66.2	6.73 ±0.09	3.78 ^b ±0.07	2.90 ^a ±0.04
3	2047.2 ^c ±80.5	1321.2 ±58.8 ^c	1600.1 ^b ±34.5	1661.3 ^b ±67.2	6.97 ±0.40	3.87 ^b ±0.07	2.85 ^a ±0.07
4	1952.4 ±81.2 ^c	1340.8 ±64.2 ^c	1586.0 ^b ±31.1	1603.9 ^b ±56.2	6.71 ±0.40	3.81 ^b ±0.09	2.87 ^a ±0.06
5	2285.1 ^b ±84.1	1752.6 ±55.7 ^b	1735.9 ^b ±25.1	1944.3 ^b ±34.6	6.85 ±0.51	4.07 ^a ±0.09	2.77 ^{ab} ±0.07
6	2597.9 ^b ±50.6	1776.7 ±64.3 ^b	1862.2 ^a ±23.1	2296.1 ^a ±33.5	7.07 ±0.41	4.10 ^a ±0.08	2.92 ^a ±0.05
7	2775.5 ^b ±88.7	1944.9 ±60.1 ^b	2024.0 ^a ±22.4	2484.6 ^a ±56.6	6.50 ±0.23	4.05 ^a ±0.07	2.45 ^b ±0.05
8	2964.9 ^a ±80.7	2179.5 ±66.3 ^a	2173.2 ^a ±25.1	2640.6 ^a ±58.1	6.59 ±0.32	4.10 ^a ±0.07	2.45 ±0.08 ^b
9	2977.1 ^a ±77.1	2206.5 ±64.2 ^a	2180.6 ^a ±42.1	2675.5 ^a ±55.9	6.75 ±0.60	4.40 ^a ±0.08	2.35 ±0.08 ^b
10	2928.6 ^a ±78.9	2193.4 ^a ±65.4	2217.3 ^a ±37.8	2671.4 ^a ±39.4	6.77 ±0.52	4.20 ^a ±0.09	2.49 ±0.07 ^b
11	3015.8 ^a ±85.7	2233.4 ^a ±64.2	2379.4 ^a ±22.4	2755.7 ^a ±38.9	6.73 ±0.31	4.14 ^a ±0.06	2.58 ±0.07 ^{ab}
12	3155.4 ^a ±79.6	2326.7 ^a ±66.8	2104.4 ^a ±24.7	2867.9 ^a ±33.2	6.41 ±0.20	4.04 ^a ±0.07	2.36 ±0.06 ^b

a, b and c: Means within the same column with different superscripts are significantly different at $P < 0.05$.

Effect of interaction between treatment and collection week:

It is of interest to note that statistical analysis revealed that the effect of interaction between tonophosphane treatment and collection week on all parameters studied was not significant, reflecting the best results of bulls in G4 as compared to other groups at all collection weeks (unshown data).

CONCLUSION

In conclusion, intramuscular injection with tonophosphane as a phosphorus source once weekly pre-collection of semen showed pronouncedly positive effects on sexual desire, semen quality and health status of Egyptian buffalo bulls. Tonophosphane injection at a level of 10 ml/head showed the best results.

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تأثير التونى فوسفان كمصدر للفسفور على الرغبة الجنسية وجودة السائل المنوى لطلائق الجاموس المصرى

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اجريت هذه الدراسة لتقييم الرغبة الجنسية ، صفات السائل المنوى الطبيعية وبعض مكونات الدم لطلائق الجاموس المصرى المحقونة بالتونى فوسفان اثناء فصل الصيف. استخدم فى هذه الدراسة عدد ٢٠ طلوقة ناضج جنسيا متوسط اعمارها ٤ سنوات وبمتوسط وزن ٦٠٠ كجم عند بداية التجربة قسمت على اربعة مجموعات تجريبية تحتوى كلا منها على خمسة طلائق. المجموعة الاولى مجموعة مقارنة لم تعطى اى معاملة باقى المجموعات من المجموعة الثانية والثالثة والرابعة حقنت بالتونى فوسفان بمعدل ٥ ، ٧ ، ١٠ مل اسبوعيا على التوالى لمدة ثمانية اسابيع . تم تقدير زمن التفاعل الجنسى ومحيط كيس الصفن ، تم تجميع السائل المنوى بالمهبل الصناعى وتجميع عينات الدم لمدة ١٢ اسبوع . اظهرت النتائج انخفاض معنوى فى زمن التفاعل الجنسى وحدثت زيادة معنوية فى محيط كيس الصفن مع زيادة مستوى المعاملة حتى المجموعة الرابعة على التوالى ، جميع صفات السائل المنوى الطبيعية (حجم القذفة، الحركة الكلية والفردية، الاسيرمات الحية ، تركيز الاسيرمات الطبيعية)زادت معنويا فى المجموعة الرابعة بالمقارنة بباقى المجموعات كذلك العدد الكلى للاسيرمات. حدثت زيادة فى بروتينات الدم فى المجموعات المعاملة ماعدا الجلوبيولين زاد فقط فى المجموعة الثالثة بالمقارنة بالكنترول. زاد كلا من محيط كيس الصفن وحجم القذفة، الاسيرمات الطبيعية ، تركيز الاسيرمات، العدد الكلى للاسيرمات والحركة الكلية والفردية مع زيادة مدة المعاملة تدريجيا كما حدث تحسن ايضا فى زمن التفاعل الجنسى ولكن انخفض الحيوانات المنوية الحية.

نستخلص من هذه الدراسة ان الحقن العضلى بمركب التونى فوسفان كمصدر للفسفور مرة واحدة اسبوعيا قبل جمع السائل المنوى له تأثير ايجابى على الرغبة الجنسية ، صفات السائل المنوى والحالة الصحية العامة للطلائق الجاموس المصرى وكان افضل المعاملات هو الحقن بمعدل ١٠ مل تونى فوسفان اسبوعيا.