

**Reproductive Performance Improvement in Awassi Ewes by using****Ascorbic acid and B-Complex Vitamins During Postpartum Period**

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\* Collage of Veterinary Medicine-Baghdad University.

\*\* Technical Institute of Al-Musiab-University of Al-Forat Al-Awsat

**Received : 2 September 2015 ; Accepted : 24 February 2016****Abstract**

This study was conducted on 44 Awassi ewes (40 days postpartum period) from Nov. 2014 – July 2015, their ages ranged from 2-4 years old in farm animals of Al-Musiab technical institute/Al-Forat aAl-Awsat University –Babylon province. These animal were divided randomly in to equal 4 groups (11 ewes/groups) dependent on the type of the treatment, 1<sup>st</sup> group treated by one gm vitamin C daily/orally for 20 days, 2<sup>nd</sup> group treated by one gm of vitamin B-complex/orally for 20 days, 3<sup>rd</sup> treaded with mixed one gm vitamin c + one gm vitamin B-complex in the same dose one (gm daily /orally for 20 days also, but the 4<sup>th</sup> group represented control group (Untreated). All experimented animals exposed to fertile rams (3rams aged 2-4 years) daily after ceased treatment. The response for different treatment (estrous showing) was recorded highly significant different( $p<0.01$ ) for 3<sup>rd</sup> groups (90.9) compared with other groups while the duration of response was  $10.26\pm 3.14$  days,  $16.52\pm 2.36$ ,  $8.24\pm 3.21$  and  $66.47\pm 11.54$  in the 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> groups respectively with highly significant difference ( $p<0.01$ ) of 1<sup>st</sup> and 3<sup>rd</sup> groups compared with 2<sup>nd</sup> and 4<sup>th</sup> groups but the pregnancy rate was recorded 100% in 3<sup>rd</sup> groups and 87.5%, 85.7% and 87.5% in the 1<sup>st</sup>, 2<sup>nd</sup>, 4<sup>th</sup> groups respectively, while the twining rate in the treated groups was recorded highly significant differences(  $p<0.01$ ) compared with control groups. While the progesterone

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and estrogen serum levels significantly ( $p < 0.01$ ) higher in treated groups in compare with control groups . concluded that the using of vitamin C, vitamin B-complex alone or together give significant results for improvement of reproductive performance include response animals (induced estrous) and reduce the duration of response as well as increasing pregnancy and twining rate in Awassi ewes.

**Key words:** Awassi ewes, vitamin C, vitamin B complex

تحسين الأداء التناسلي في ألنعاج العواسي باستخدام فيتامين سي وفيتامين بي المركب خلال فترة ما

بعد ألولادة

طالب موسى عبد الله الحميداوي\* تمارا ناطق داود\* احمد هادي محمد\*\* منير لايح عذاب\*\*

\*كلية الطب البيطري - جامعة بغداد

\*\*المعهد التقني المسيب - جامعة الفرات الأوسط ألتقنية

ألخلاصة

أجريت الدراسة على 44 نعجة عواسي (بعد فتره 40 يوم من الولادة) وخلال الفترة ما بين تشرين الثاني 2014 وحتى تموز 2015 وتراوحت أعمارها ما بين 4-2 سنوات وذلك في الحقل الحيواني التابع للمعهد التقني في المسيب محافظة بابل- قسمت الحيوانات إلى أربع مجاميع متساوية (11 نعجة لكل مجموعة) عشوائيا بموجب نوع المعاملة العلاجية، ألمجموعة الأولى تم إعطاءها 1 غرام فيتامين سي عن طريق الفم يوميا ولمدة 20 يوم والمجموعة الثانية أعطيت 1 غرام فيتامين (بي) عن طريق الفم، أما ألمجموعة الثالثة فقد أعطيت 1 غرام فيتامين(بي+سي) بجرعة 1 غم لكل منهما عن طريق الفم ولمدة 20 يوم فيما تركت ألمجموعة الرابعة بدون معاملات واعتبرت كمجموعة سيطرة. جميع حيوانات التجربة عرضت إلى الكباش ألمخصبه والتي كان عددها ثلاثة وبأعمار 4-2 سنوات وبشكل يومي بعد انتهاء المعاملات لأغراض كشف الشبق والتلقيح معا. سجلت الاستجابة للمعاملات (إظهار الشبق)نسبه 90.9% فيا لمجموعة الثالثة وبفارق إحصائي عالي ( $p < 0.01$ ) مقارنة مع في المجاميع الأخرى، كما إن فترة الاستجابة سجلت  $3.14 \pm 10.26$ ,  $3.21 \pm 8.24$  يوم بالنسبة للمجموعتين الأولى والثالثة مقارنة مع  $2.36 \pm 16.52$  و  $11.54 \pm 66.47$  بالنسبة للمجموعتين الثانية والرابعة وبفارق إحصائي ( $p < 0.01$ ) يميل لصالح المجموعتين الأولى والثالثة وكانت نسبة الحمل للمجاميع الأربعة 100% ، 87.5% ، 85.7% و 87.5% على التوالي ، بينما سجلت نسبة التوائم فارق معنوي مهم  $p < 0.01$  لمجاميع المعاملات مقارنة بمجموعة السيطرة . أما مستوى هرموني البروجسترون والاستروجين في المصل سجلا فارق إحصائي مهم  $p < 0.01$  بعد المعاملة مقارنة بمستواهما قبل المعاملة وذلك في المجاميع الثلاثة الأولى بينما لم يظهر أي فارق إحصائي

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بمستوى كلا الهرمونيين في مجموعة السيطرة خلال نفس الفترة التي تمت معاملة المجاميع الأخرى فيها بالفيتامينات (فيتامين سي وفيتامين بي). من ذلك نستنتج بان استخدام فيتامين سي أو بي كل لوحده أو كلاهما معا يعطي نتائج ايجابية مهمة فيما يخص تحسين الأداء التناسلي والمتضمن الاستجابة لهذه الفيتامينات (إحداث الشيق) واختزال فترة الاستجابة إضافة إلى زيادة في نسبتي الحمل والتوائم في النعاج العراقية الحلوب .  
الكلمات المفتاحية: نعاج عواسي، فيتامين سي، فيتامين بي المركب.

### Introduction

Ewes and goats like any other living animals must consume feed containing essential nutritionals to support body function as well as various reproductive functions include growth, pregnancy and lactation (1). Vitamin recently received a great deal of attention because of their action of immune response and disease in animals and consequently on their production (2). Miclea *et al* (3) noticed that supplementation with combinations of  $\alpha$ -tocopherol and ascorbic acid could improve the maturation and expansion of sheep cumulus-oocyte complexes. Vitamin B-complex are water-soluble vitamins functioning as a coenzyme in a number of biochemical reactions such as methionine synthesis and the metabolism of branched amino acids and because of its stability (4), as for reproductive performance, Its was demonstrated that would be improved in human (5). Dawood and Al-Saigh (6) reported that treated groups with vitamin B and C of rabbits were recorded significantly higher fertility rate and reproductive efficiency rate compared with the control groups, while the researchers showed that supplementation with vitamin B-complex improved significantly the semen extender benefit the motility and viability of crossbreed ram sperm (7). The aims of study were to evaluate the effect of vitamin C, vitamin B-complex or vitamin C+B on reproductive performance in lactating Iraqi ewes.

### Materials and Methods

This study was conducted on 44 Awassi ewes (40 days postpartum) of aged 2-4 years in farm animals of Al-Musiab technical institute/ Al-Forate Al-Awasat University / Babylon province

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during the period from 2014-2015. The animals divided randomly in to 4 groups according to the type of treatment .

Every group include 11 ewes on each one, 1<sup>st</sup> group treated by 1 gm of vitamin C daily/orally for 20 days, 2<sup>nd</sup> group treated with one gm of vitamin B-complex orally daily for 20 days, 3<sup>rd</sup> group treated with mixed of 1 gm vitamin C + 1 gm vitamin B complex in the same dose daily/orally, 4<sup>th</sup> group no treated and serve as a control group. All experimental animals exposed to fertile ram (3rams aged 2-4 years) daily after ceased treatment. Response of animals, duration of response pregnancy rate, nature and type of parturition was recorded in addition to measure the serum levels of estrogen and progesterone before and after treatment by using specific kits (Immunotech. Abeckman coulter company, Czech Republic), and Gamma counter according to Berga and Dainiels (8) in specialist laboratory for hormone analysis. Statically analysis include mean, stander error, Chi square, F-test and analysis of variance were used according to (9).

**Results and Discussion**

The results showed in table-1- the animal response to different treatments for induction of estrus and recorded 72.7%(8/11),63.6%(7/11),90.9(10/11) and72.7%(8/11)in 1<sup>st</sup>, 2<sup>nd</sup> and 4<sup>th</sup> group with best significant differences for 3<sup>rd</sup> group compared with other groups, also this significant was between 1<sup>st</sup> and 4<sup>th</sup>gtoup compared with 2<sup>nd</sup> group.



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**Table 1: The Type of treatment, Animal response, Duration of response in Awassi Ewes**

Groups	No of animals	Type of treatment	Animal response		Duration of response (days) M ± SE
			No	%	
G1	11	1gm vit C /orally for 20 days	8	72.7 b	10.26±3.14 a
G2	11	1gm vit B /orally for 20 days	7	63.6 c	16.52±2.36 b
G3	11	1gm vit C + vit B /orally for 20 days	10	90.9 a	8.24±3.21 a
G4	11	Without treatment (control group)	8	72.7 b	66.47±11.54 c
<b>Total</b>	<b>44</b>	-	<b>33/44</b> (75%)	<b>Treated 25/33</b> (75.7%). <b>UT</b> 72.7%	-

Different letters mean significant differences ( $p < 0.01$ )

These results was recorded for the first trial in ewes, but many authors recorded higher prolificacy ratio by using this vitamins in laboratory animals (rabbits) as well as higher fertility rate and reproductive efficiency ratio with control group and emphasized that using B-complex + vit. C showed better prolificacy than the vitamin C groups (6), also saikhun et al (10) reported that they increase the development embryo in swamp buffalo by in vitro fertilization and in vivo maturation (IVM/IVF) by using vitamin C, while the duration of response was  $10.26 \pm 3.14$  days,  $16.52 \pm 2.36$  days,  $8.24 \pm 3.21$  days, and  $66.47 \pm 11.54$  days in 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> groups, but the 1<sup>st</sup> and 3<sup>rd</sup> group recorded higher significant differences ( $p < 0.01$ ) compared with 2<sup>nd</sup> and 4<sup>th</sup> group and significant higher ( $p < 0.01$ ) between 2<sup>nd</sup> compared with 4<sup>th</sup> group, we believe that the main rate of vitamins was also support body functions well as various productive function especially growth and pregnancy and the low level of vitamins in plasma lead to reduction of animal production and these information in agreement with (1 and 2).

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**Table 2: The Pregnancy ratio, Nature & Type of parturition in Awassi Ewes**

Groups	Response animals	Pregnancy ratio %		Nature of parturition		Type of parturition	
				ND		Single	Twins
G1	8	7	87.5b	7	0	6	1
G2	7	6	85.7b	5	1	5	1
G3	10	10	100a	8	2	7	3
G4	8	7	87.5b	6	1	7	0
	33/44 75%	30/33 90.9%	T. 23/25 92% UT. 7/8 (87.5%)	26/30 86.6%	4/30 13.4%	25/30 83.3% Treat 18/23 (78.2%)	5/30 16.7% 5/23 (21.8%)

Different letters mean sig. differences (p<0.01)

The pregnancy rate was 87.5% (7/8), 85.7% (6/7), 100% (10/10) and 87.5 (7/8) in 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> group respectively, with higher significant differences for 3<sup>rd</sup> group compared with other groups and these finding in agreement with many others using hormonal treatments (12, 13 and 14) supported by Micleal et al (3) that they found the influence of maturation of sheep oocytes by combination between  $\alpha$ -tocopherol and ascorbic acid, in addition to improve the maturation and expansion of sheep cumulus oocyte complexes, moreover Miclea et al (11) found the important rate of vitamins on swine embryo development. The results in table (3) was obtain the increasing progesterone in serum level in treated group by vitamin C, B-complex or mixed vit B and vit C compared with control group with best significant differences (p<0.01), also estradiol in serum levels was higher in treated group compared with control group, these results mean the important role of vitamins (C+B) for reduce oxidative stress and improve the blastocyst development rate.

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**Table 3: Effect of Vit. C and Vit. B complex on serum levels of Progesterone concentration (nMol/L) in Awassi Ewes**

Groups	Progesterone Concentration Before	Progesterone Concentration After
G1	26.43±5.32 a A	39.46±6.26 b A
G2	28.56±4.36 a A	45.15±7.42 b A
G3	30.65±6.37 a A	41.22±6.35 b A
G4	31.12±4.46 a A	33.64±5.84 a B

-Small different letters means Sig. differences ( $p<0.01$ ) within groups.

- Capital different letters means Sig .different ( $p<0.01$ ) between groups.

**Table 4: Effect of Vit. C and Vit. B complex on Serum levels of Estradiol concentration (nMol/L) in Awassi Ewes**

Groups	Estradiol Concentration Before	Estradiol Concentration After
G1	103.16±22.90 a A	215.37±22.30 b A
G2	62.16±15.70 a A	198.56±24.17 b B
G3	86.26±6.54 a B	226.35±27.59 b A
G4	83.62±12.35 a B	88.47±14.56 a C

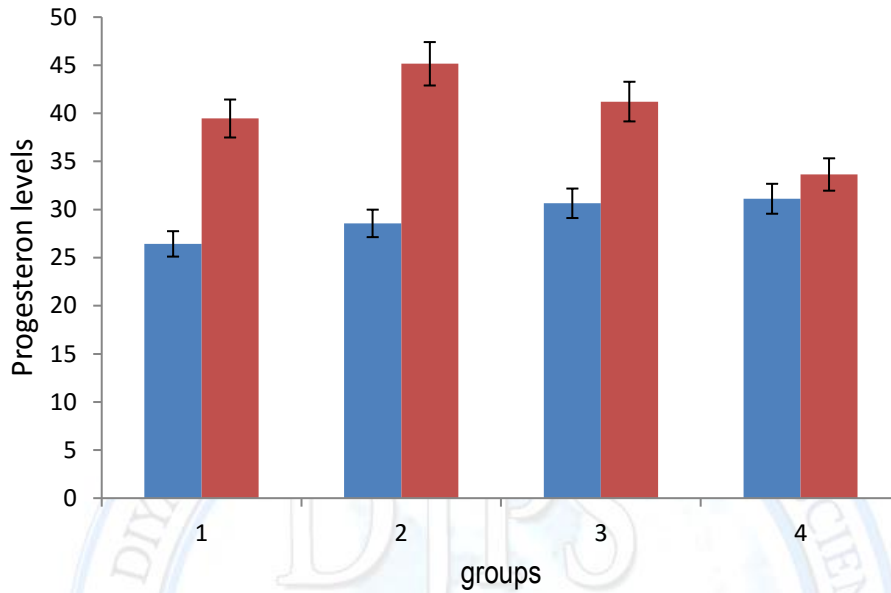
-Small different letters means Sig. differences ( $p<0.01$ ) within groups.

- Capital different letters means Sig .different ( $p<0.01$ ) between groups.

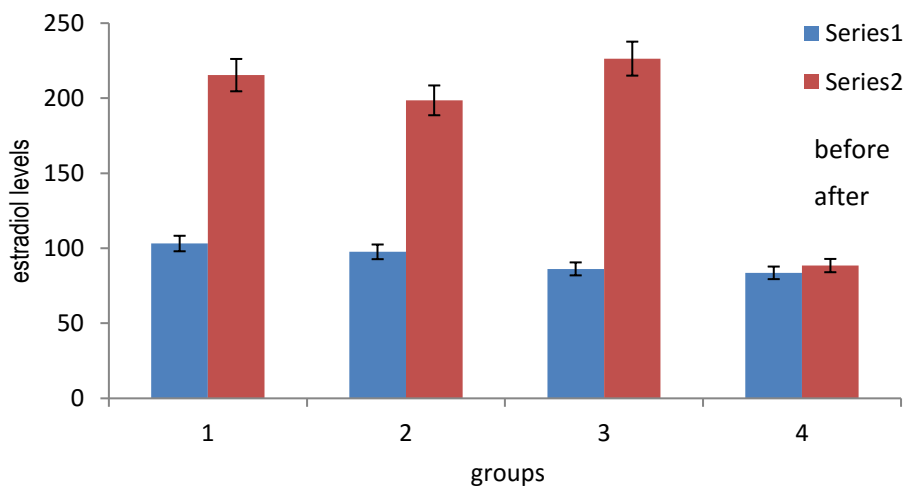
In conclusions that they using vitamins include vitamin C, B-complex or B+C together gives a significant results through the return of animal to estrous behavior during lactating period with improvement of duration of response, pregnancy rate and type of parturition related with increased in twinning rate.

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**Fig. 1-Effect of Vit. C and Vit. B complex on Serum levels of Progesterone Concentration (nMol) in Awassi Ewes.**



**Fig 2-Effect of Vit. C and Vit. B complex on serum levels of Estradiol Concentration (nMol) in Awassi Ewes.**



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