

REPRODUCTIVE PERFORMANCE IMPROVEMENT IN LACTATING IRAQI GOATS BY USING *CUMINUM CYMINUM* SEEDS

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ABSTRACT

This study was conducted on 48 Iraqi lactating goats (40 days postpartum) in animals farm of Al-Musiab technical institute/ University Al-Forat Alwasat/ Babylon province during the period from 2014-2015. Animals age were ranged 2-5 years old were equally and randomly divided into four groups (12 does for each) according to the type of treatment. 1st group were treated with 3% cumin seeds of 0.5 kg of the concentrate diet (15 gm) daily for 10 days, 2nd group which treated by 3% cumin seeds for 20 days, 3rd group treated by 3% cumin seeds for 30 days while the 4th group considered as control group (without treatment). All animals in this study exposed to fertile buck (4 bucks aged 2-4 years) daily after cessed treatment for detected animal which estrus showing (natural mating 2 times). The result showed that the animals response was recorded higher significant differences ($p<0.01$) for the 2nd and 3rd group (83.30%) compared with 1st and 4th groups (66.60 and 75%), which the duration of response was recorded best significant differences ($p<0.01$) in 2nd and 3rd group compared with 1st and 4th group as well as the pregnancy and twining rate recorded superior significant difference ($p<0.01$) for 1st and 3rd group compared with 2nd and 4th groups. We concluded that using of cumin seeds with different periods out of breeding season (lactating period) play an important role for improvement the fertility of lactating Iraqi goats by increased induction of estrus and pregnancy rate as well as twining without reproductive problems during gestation period.

INTRODUCTION

Cumin is aromatic herbs and culinary spices, one of the commonly used spices in food preparations also it is used in traditional medicine and particularly in veterinary practice as a stimulant, a carminative, astringent and as antioxidant property of cumin seeds (1,2). Cumin product has shown significant antioxidant activity, these effects are documented as their ability to prominently quench hydroxyl radicals and lipid peroxides (3). Cumin seed has been found to reduce plasma cholesterol levels in diabetic rats. (4).

Cuminum cyminum, a phytoestrogen-rich plant which contain estrogenic compounds like β -sitosterol, stigmasterol, apigenin and luteoline, thus *Cuminum cyminum* can be a good candidate for developing new estrogenic herbal drug (5).

Maliani (6) was reported the estrogenic activity of acetone extract of *Cuminum cyminum* in immature ovariectomized rats and earlier in mature male rats (7).

While Jagtap (5) and Agarwal (10) showed that methanolic extract of *Cuminum cyminum* can be a potential candidate to be explored for the treatment of menopausal disorders, especially cardiovascular disorders in postmenopausal women.

Other researcher found that adding ground cumin seeds (3%) to the concentrate diet of Awassi sheep cause an improvement in body performance and reproduction response were increased significantly ($p < 0.05$) also they were noticed that reduction in the cholesterol and triglyceride levels in the treated than the control group (11).

Recently studies depended on many plant (*Glycyrrhiza glabra* and cumin seeds) which improved fertility in farm animals especially in sheep and goats (Lauger, 1988; walken-brown et al.;1999) may be because of their nutritional value which contain protein, carbohydrates, unsaturated fatty acids, sugars, vitamins and minerals (1,10). The aims of study were to evaluate the effect of cumin seeds upon improvement of reproductive performance in lactating Iraqi goats include many reproductive parameters (animals response, duration of response, pregnancy rate as well as type and nature of parturition).

MATERIALS AND METHODS

This study was performed on 48 lactating Iraqi goats 40 days postpartum of aged 2-5 years old in farm animals of Al-Musiab technical institute/ Al-Forat/ Al-Awsat University/ Babylon province during the period from 2014-2015. These animals divided randomly into four groups according to the type of treatments, all groups include 12 does on each one; 1st group treated by 3% cumin seeds (as powder mixed with 15 ml diluted water) from 0.5 kg of concentrate diet (15 gm daily for 10 days, 2nd group treated by 3% cumin seeds from 0.5 kg of concentrate diet (15 gm daily) for 20 days, 3rd group treated by 3% cumin seed from 0.5 kg of concentrate diet (15 gm daily) for 30 days, 4th group untreated and represented as control group. All animals exposed to fertile buck (4 bucks aged 2-4 years) daily after cessed treatment.

A response of animals (number of animal showing estrus behavior), duration of response (period from treatment to initiating estrus); pregnancy rate, nature and type of parturition was recorded. As well as recorded the serum level of estrogen and progesterone before and after treatment by using specific kits and gamma counter (12) in specialist laboratory for hormones analysis statistical analysis include mean, standard error, chi-square, F-test and analysis of variance were used and conducted according to (13).

RESULTS AND DISCUSSION

The results in table (1) showed the animal response to 3% cumin seen in different periods and they recorded 66.6% (8/12), 83.3% (10/12) and 75% (9/12) in the 1st, 2nd, 3rd and 4th group respectively with best significant differences ($p < 0.01$) related to 2nd and 3rd group compare with 1st and 4th group.

Table (1) revealed the type of treatment cumin seeds, animal's response and duration of response in lactating Iraqi goats

Group	No. of animals	Type of treatment	Animals response (days) M±SE	Duration of response (days) M±SE
G1	12	15 gm cumin seeds for 10 days/orally	8 66.6 C	35.62±4.16 b
G2	12	15 gm cumin seeds for 20 days / orally	10 83.3 a	7.23±2.01 a
G3	12	15 gm cumin seeds for 30 days orally	10 83.3 a	5.32±1.46 a
G4	12	Without treatment control group	9 75 b	82.15±8.46 c
Total	48		Treated 28/36 77.7% Untreated 9/12 75%	

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

These response may be due to the effect of cumin seeds on LH and FSH secretion as well as the cumin seeds have nutritional value which contain proteins and sugars, these finding agreement with (7 and1), while the duration of response was recorded 35:62±4.16 days, 7.23±2.01 days, 5.32±1.46 days and 82.15±8.46 days in 1st, 2nd, 3rd and 4th group respectively with superior significant differences ($p < 0.01$) for the 2nd and 3rd groups compared with 1st and 4th group respectively, these results was recorded in Iraq which represented the first trial about this subject compared with other studies which performed on male (ram or buck) or lab animals only but this results in agreement with many authors used hormonal treatments for the same purposes (Al hammedani 15, baldassarre 14, evans 13). The pregnancy rate revealed

in (table 2) was recorded 87.5 % (7/8), 80% (8/10), 90% (9/10) and 77.7% (7/9) in the 1st, 2nd, 3rd and 4th group respectively with high significant differences ($p<0.01$) for the 1st and 3rd group compared with 2nd and 4th group,

Table (2) revealed the type pregnancy rate, nature and type of parturition in lactating Iraqi goats

Group	Response animals	Pregnancy		Nature of parturition		Type of parturition	
		Rate No.	%	N	D	S	T
G1	8	7	87.5 a	7	-	6	1
G2	10	8	80 b	7	1	6	2
G3	10	9	90 a	8	1	7	2
G4	9	7	77.7 c	6	1	7	-
Total	37/48	Treated				Treated	
	77.08%	24/28	89.2%	28/32	3/32	19/24 80%	5/24 20%
		Untreated		90.6	9.4	Untreated	
		7/9	77.7%			7/7 100%	0/7 0%

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

we believe that the results due to the rate of cumin seeds for the secretion of FSH and LH which play a role of successive ovulation and pregnancy these finding agreement with (7and1), while the level serum of progesterone (table,3, Paragraph, 1) was recorded high significant differences after treatment in 1st, 2nd and 3rd groups which treated with cumin with different periods compared with control group (no significant differences between and after treatment, these results may be cumin seeds contain cholesterol a compound of chemical structure (precursor of steroids hormone like progesterone), these finding was supported was supported by (4 and 6), but the level of serum estradiol (table, 4, Paragraph, 2) was recorded superior significant differences in the treated group ($p<0.01$) compared with control group, we believed that the cumin seeds a phytoestrogen-rich plant and contain estrogenic compounds like stigmasterol and luteoline supported by (5). In conclusion that they use cumin seeds in postpartum period improved reproductive performance in lactating Iraqi ewes during reduce the anestrus period which include fertile estrus with high rate of pregnancy and increased in twinning rate.

Table (3) effect of cumin seeds on progesterone concentration (nMol/L) in Iraqi lactating goats

Groups	Progesterone conc. before treated M±SE	Progesterone conc. after treated M±SE
G1	26.43±5.32 aA	36.42±6.26 bB
G2	28.56±4.36 aA	46.15±7.42 bA
G3	30.65±6.37 aA	37.22±6.35 bB
G4	31.12±4.46 aA	32.62±5.84 aC

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

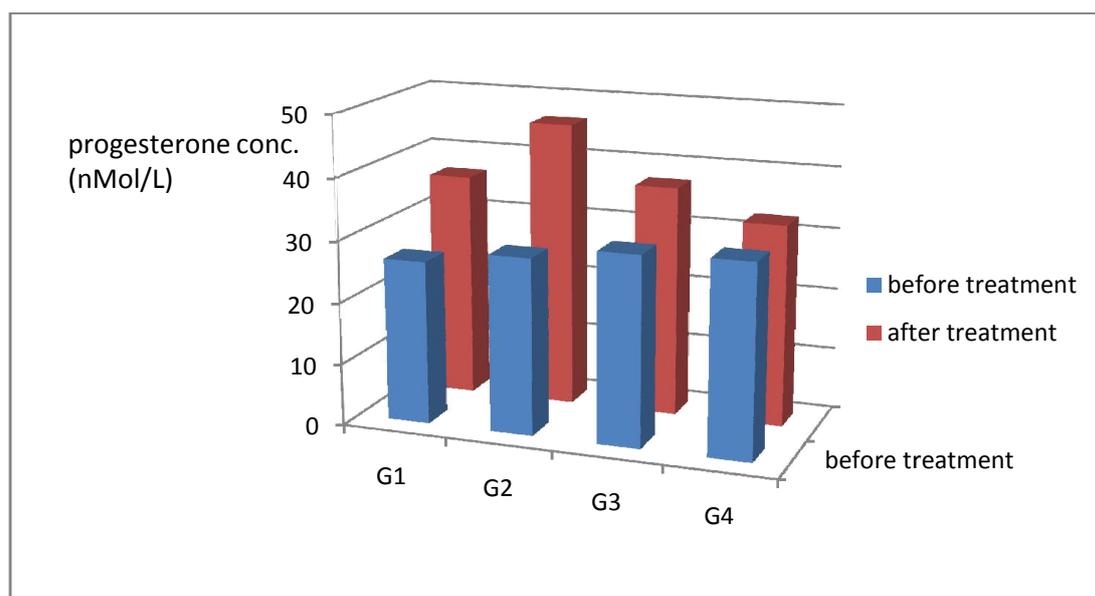
**Figure-1- effect of cumin seeds on progesterone concentration (nMol/L) in Iraqi lactating goats**

Table (4) effect of cumin seeds on estradiol concentration (nMol/L) in Iraqi lactating goats

Groups	Estradiol conc. before treated M±SE	Estradiol conc. after treated M±SE
G1	84.29±14.57 aA	195.34±32.26 bA
G2	86.43±12.64 aA	184.53±31.64 bB
G3	89.32±6.27 aA	197.23±29.26 bA
G4	93.21±18.23 aA	94.42±14.46 aC

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

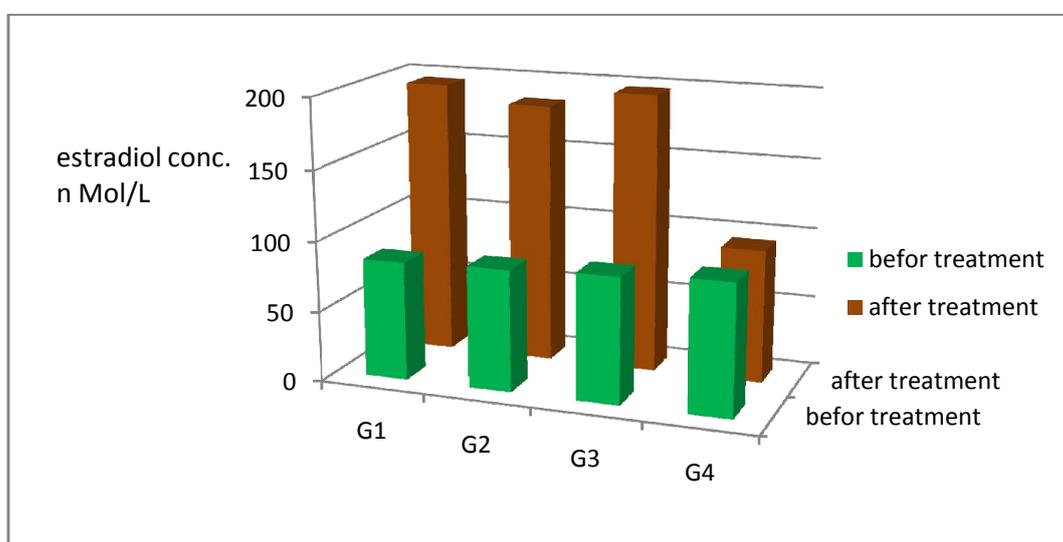


Figure -2- effect of cumin seeds on estradiol concentration (nMol/L) in Iraqi lactating goats

تحسين الاداء التناسلي في الماعز العراقي الحلوب باستخدام بذور الكمون

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الخلاصه

اجريت الدراسة على 48 معزة عراقية حلوب (بعد فترة 40 يوم من الولادة) في الحقل الحيواني التابع الى المعهد التقني في المسيب/ كلية الفرات الاوسط / محافظه بابل خلال الفترة من 2014-2015 وتراوحت اعمار الحيوانات ما بين 2-5 سنوات. تم تقسيم حيوانات البحث الى اربعة مجاميع عشوائيا بموجب نوع المعاملة المستخدمة. المجموعه الاولى (12 معزه) عوملت من خلال اعطائها 15 غم من مسحوق بذور الكمون المطحون والمذاب في الماء (3%) من بذور الكمون لكل 0.5 كغم علف مركز) لمدة 10 ايام فيما اعطيت حيوانات المجموعه الثانية (12 معزه) 15 غم من مسحوق بذور الكمون لمدة 20 يوم اما المجموعه الثالثة فقد تم اعطائها 15 غم من البذور ولمدة 30 يوم فيما تركت حيوانات المجموعه الرابعه بدون معاملة ومثلت مجموعته السيطرة حيث ضمت 12 معزة ايضا، عرضت جميع حيوانات التجربة الى اربعة جداء خصبة وباعمار 2-4 سنوات يوميا بعد توقف المعاملة لتحديد الحيوانات التي تظهر الشبق ومن ثم تلقيحها لمرتين على الاقل.

اظهرت النتائج ان الاستجابة لهذه المعاملات قد سجلت فروق معنوية ($p < 0.01$) للمجموعتين الثانية والثالثة (83.3%) مقارنة مع المجموعتين الاولى والرابعة (66.6، 75%) ، بينما كانت فترة ظهور الشبق سجلت فرق معنوي ($p < 0.01$) للمجموعه الثانية والثالثة مقارنة مع الاولى والرابعة، اضافة الى ان معدل الحمل والتوائم سجل افضلية معنوية بمستوى ($p < 0.01$) للمجموعتين الاولى والثالثة مقارنة مع الثانية والرابعة.

وعليه نستنتج ان استخدام بذور الكمون ويفترات مختلفه خارج الموسم التناسلي (فترة الرضاعه) لعب دورا مهما في تحسين الخصوبه في الماعز العراقي الحلوب من خلال استحداث الشبق ومعدل الحمل اضافة الى زيادة معدل التوائم بدون مشاكل تناسلية خلال فترة الحمل.

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