Kirkuk University Journal for Agricultural Sciences
ISSN:2958-6585
https://kujas.uokirkuk.edu.iq

RESEARCH ARTICLE https://doi.org. 10.58928/ku25.16305

Effects of Green Cardamom on some Sex Hormones in Karadi Male Lambs.

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Received: 23/03/2025 **Revised: 17/05/2025** **Accepted: 08/06/2025** **Published: 01/09/2025**

ABSTRACT

Cardamom Elettaria cardamomum a spice with known antioxidant and bioactive properties, has been studied for its potential effects on animal physiology, including reproductive hormones. Male lambs were divided randomly and equally into four groups control group and three treatments. This study investigates the impact of dietary cardamom supplementation on sex hormone levels in lambs. Specifically, we examine changes in testosterone, luteinizing hormone (LH), and follicle-stimulating hormone (FSH) in response to varying doses of cardamom in the diet. The results indicate that cardamom may influence endocrine function by modulating hormone secretion, potentially enhancing reproductive efficiency. The observed effects are likely due to cardamom's phytochemical composition, including flavonoids and essential oils, which may interact with endocrine pathways. These findings suggest a potential role for cardamom as a natural supplement to improve reproductive performance in male lambs. Further research is needed to determine optimal dosages and long-term effects on reproductive health. The aims of this study were to evaluate the impact of using of the cardamom powder on some sex hormones in karadi male lambs. This study was conducted in the field in Animal Science Department, College of Agricultural Engineering Science, University of Sulaimani. the total number of animals which used in the study was (12) male lambs with an average live weight of (24.38±2.8) kg were used in this study. Blood samples (10 ml) were collected via the jugular vein and then part of blood is transferer to plain tubes for serum preparation, Serum samples were used for estimation the testosterone, LH , FSH . The results indicate that there was significant effect of green cardamom powder on serum FSH, LH hormones, but no significance effect on serum testosterone level in karadi lambs for all treatments.

***Keywords*:** Cardamom, Testosterone, LH, FSH, lambs.

Introduction

Animal production has been improved by several methods, including the use of feed additives to accelerate growth and promote animal health [1]. [2] use of organic feed additives in feed production is increasingly acknowledged as a means to lower production costs. minimise expenditures and improve nutritional absorption and physiological performance [3]

Cardamom [4], also known as cardamon or cardamum, is a spice obtained from the seeds of various plants belonging to the genera Elettaria and Amomum within the Zingiberaceae family. The development of male reproductive organs and secondary sexual characteristics [5], including increased body hair, bone density, and muscular mass, is significantly regulated by testosterone, which also influences overall health and well-being [6]. The level of LH is directly related to the amount of testosterone released [7]. Excessive secretion of LH reduces the effects of FSH and increases androgen production by the cells, as seen in [8].

Aims of the study Evaluate the impact of green cardamom powder on sex hormones of male lambs.

Material and method

This study was conducted at the Animal Science farm, College of Agriculture Science engineering, University of Sulaimani, from the 1st of October 2024 to1st of January 2025.

1. **Experimental Animals and Ration:**

A total of (12) Karadi male lambs, 3-4 months old with an average live weight of (24.38±2.8) kg were used in this study. Male lambs were divided randomly and equally into four groups (3 male lamb for each group). First group was left without treatment and considered as control group (C). (T1) In the treatment groups basal diet with (40mg) cardamom powder/ kg body weight. In the treatment groups (T2) basal diet with (80mg) cardamom powder /kg body weight. In the

treatment groups (T3) basal diet with (120mg) cardamom powder /kg body weight.

2. **Blood sampling:**

Blood samples (10 ml) were collected via the jugular vein and then is transferer to plain tubes for serum preparation. Blood samples taken at first time (after two weeks) and end time (after 12 weeks of the experimental).

3. **Laboratory analysis:**

Serum used to determine the concentration of Testosterone, LH and FSH hormones

4.Statistical Analysis:

Statistical analysis system - XLstat. (2010) program was used for data analysis. The Complete Randomized Design (CRD) was used to study the effect of three levels of cardamom powder/ kg body weight (40, 80 and 120 mg / Kg of body weight). [9] multiple range test was used to determine the significance differences between means. The **statistical** model for analysis of variance was:

$Yij = \mu + Ai + eij$

Yij = observation j in level i of factor A (j = 1,...., 6)

μ = the overall mean

Ai = the effect of level i of factor A (i = 1, 2, 3)

eij = random error associated with means = 0 and variance $\delta 2e$

Result and Discussion

This study was conducted in order to determine the effect of green cardamom powder on the serum (Testosterone, FSH, LH) hormones in karadi male lambs.

Table (1) : Effect of green cardamom powder in karadi male lambs on serum testosterone (ng/dl)

Hormone	First time		End time	
	Mean	SE	Mean	SE
Testosterone	3.057 a	0.319	0.796 a	0.283
control	3.090 a	0.082	0.611 a	0.062
T1	2.100 a	0.990	0.260 a	0.009
T2	4.240 a	0.188	0.301 a	0.004
T3	2.800 a	0.136	2.014 a	0.857

The same letters mean no significant different between all the groups.

Table (2) : Effect of green cardamom powder in karadi male lambs on serum FSH(m IU/mL).

Hormone	**First time**		**End time**	
	mean	**SE**	**mean**	**SE**
FSH	0.266 a	0.010	0.287 a	0.027
C	0.292 a	0.004	0.200 a	0.029
T1	0.272 a	0.007	0.275 a	0.008
T2	0.216 a	0.011	0.263 a	0.012
T3	0.284 a	0.012	0.410 a	0.058

The same letters mean no significant different between all the groups.

Table (3) : Effect of green cardamom powder in karadi male lambs on serum LH(IU / L) .

Hormone	**First time**		**End time**	
	mean	**SE**	**mean**	**SE**
LH	0.135 a	0.042	0.600 a	0.088

C	0.266 a	0.167	0.512 a	0.003
T1	0.084 a	0.003	0.350 a	0.006
T2	0.092 a	0.002	0.453 a	0.034
T3	0.097 a	0.003	1.083 a	0.079

The same letters mean no significant different between all the groups.

Table (4) : Effect of green cardamom powder in karadi male lambs on serum testosterone (ng/dl) , FSH(mIU/mL) and LH(IU / L).

Treatment	First time			End time		
	Testosterone	FSH	LH	Testosterone	FSH	LH
Control	3.090 a	0.292 b	0.266 a	0.611 a	0.200 a	0.512 a
T1	2.100 a	0.272 b	0.084 a	0.260 a	0.275 ab	0.350 a
T2	4.240 a	0.216 a	0.092 a	0.301 a	0.263 ab	0.453 a
T3	2.800 a	0.284 b	0.097 a	2.014 a	0.410 b	1.083 b

The different letters Mean significantly different between all treatments (P>0.05), (P>0.01).

The results shown in Table 4 demonstrate a significant disparity between the control group and the other groups based on the collected data.

Testosterone:

The results shown in Table 4 demonstrate no significant disparity between the control group and the other groups at both the initial and final time intervals. Blood testosterone levels in rams fluctuate according to breed, age, nutrition, season, and the oestrous signals of ewes [10]. Blood testosterone levels are associated with age [11], seasonal fluctuations [12], protein intake [13], and the frequency of luteinizing hormone (LH) pulses [14]. Research indicated that testosterone production in rams varies across their lives, demonstrating an increase from birth to full sexual maturity, followed by a subsequent decrease [15].

FSH and LH:

The findings of this study demonstrate a significant alteration (P<0.05) in blood FSH and LH concentrations in Karadi male lambs attributed to green cardamom powder. The comparison of data between the control group and other groups reveals a significant effect, as shown in Table 4.

The study by [16] on the effects of the hydroethanolic extract of green cardamom fruit on serum gonadotropin and testosterone levels in adult male rats exposed to lead acetate indicated that the hydroalcoholic extract likely alleviates the adverse effects of lead on the testes through elimination mechanisms and free radical neutralisation, leading to enhanced testosterone secretion and normalisation of serum LH and FSH hormone levels.

granatum extract.

Conclusion

Cardamom, acknowledged for its medicinal properties in traditional practices, contains bioactive compounds including flavonoids, terpenes, and essential oils that may affect the endocrine system in many manners. Studies involving rodents indicate that certain herbs or spices, including cardamom, may influence testosterone levels, either by direct action on the gonads or by regulating hormones like luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Additional research is necessary to ascertain whether cardamom directly affects FSH and LH levels in lambs. It is important to consult a veterinarian before to administering cardamom or any other supplement to cattle to determine its safety and effectiveness.

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تأثير الهيل الأخضر على بعض الهرمونات الجنسية في ذكور الحملان الكرادي.

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الخلاصة

الهيل *Elettaria cardamomum*، وهو نوع من التوابل يُعرف بخصائصه المضادة للأكسدة والنشطة بيولوجيًا، لمعرفة آثاره المحتملة على فسيولوجيا الحيوان، بما في ذلك الهرمونات التناسلية. تبحث هذه الدراسة في تأثير مكملات الهيل الغذائية على مستويات الهرمونات الجنسية لدى الحملان. وتحديدًا، ندرس التغيرات في هرمون التستوستيرون، والهرمون الملوتن (*LH*)، والهرمون محفيزللجريبات (*FSH*) استجابةً لجرعات متفاوتة من الهيل في النظام الغذائي. تشير النتائج إلى أن الهيل قد يؤثر على وظائف الغدد الصماء من خلال تعديل إفراز الهرمونات، مما قد يعزز الكفاءة التناسلية. يُرجَّح أن تكون التأثيرات الملحوظة ناتجة عن التركيب الكيميائي النباتي للهيل، بما في ذلك الفلافونويدات والزيوت العطرية، والتي قد تتفاعل مع مسارات الغدد الصماء. تشير هذه النتائج إلى دور محتمل للهيل كمكمل غذائي طبيعي لتحسين الأداء التناسلي لدى ذكور الحملان. هناك حاجة إلى مزيد من البحث لتحديد الجرعات المثلى والآثار طويلة المدى على الصحة الإنجابية. هدفت هذه الدراسة إلى تقييم تأثير استخدام مسحوق الهيل على بعض الهرمونات الجنسية في الذكور حملان الكرادي. أجريت هذه الدراسة ميدانيًا في قسم علوم الحيوان، كلية علوم الهندسة الزراعية، جامعة السليمانية. بلغ العدد الإجمالي للحيوانات المستخدمة في الدراسة (12) حملًا ذكرًا. تم جمع عينات الدم (10 مل) عن طريق الوريد الوداجي ثم تم نقل جزء من الدم إلى أنابيب عادية لإعداد المصل. استخدمت عينات المصل لتقدير هرمون التستوستيرون، *LH*، *FSH*. تشير النتائج إلى وجود تأثير معنوي لمسحوق الهيل الأخضر على هرموني *FSH* و *LH* في المصل، ولكن لا يوجد تأثير معنوي على مستوى هرمون التستوستيرون في المصل في حملان الكرادي لجميع المعاملات.

الكلمات المفتاحية: الحملان ، التستوستيرون، الهيل، *FSH*, *LH*.