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Ovulation Induction by Used Deslorelin Acetate in Goats During Anestrus Season

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About Article

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ABSTRACT

This study determined the inducing of ovulation in local Iraqi goats induction during seasonal anestrus using deslorelin acetate. This study used twenty-four goats that were out of breeding season between January to July 2023. The average weight of goats was 35 ± 5 kg, and aged 2.5 to 3 years. The goats were divided into 2 groups, each one containing 12 goats, all goats synchronized by vaginal sponges (60mg MAP) for 14 days. The treatment injection withdrawal of sponge. The first group received 0.1 mg of intramuscular deslorelin, and the second group (control) received normal saline. The findings of this research were ten does in the first group showed signs of estrus. The results of this study were induction of estrus 83%, Conception rate 90%, litter size 101%, Gestation length 154 ± 2.16 days, and duration of estrus 29.5 ± 4.5 hours were significantly ($p \leq 0.05$) in the treated group, While the control group did not show any reproductive performance. Progesterone concentrations were significant ($p \leq 0.05$) in all months in the treatment group compared with goats of control. Ultrasonography detection of pregnancy was 100% in treated group by deslorelin in (30 and 60 days) in comparison with control group. The conclusion of the present study was that the use of deslorelin acetate in local Iraqi goats for induction of fertile estrus and ovulation breeding season was greater rates of successful induction of estrus and ovulation and transabdominal transducer at B mode used in the (30-60 days) of pregnancy goats was accurate for early fetal determine.

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1. INTRODUCTION

Because of their exceptional capacity to adapt and survive in challenging environments, goats are among the first domesticated animal species and are among the most significant agricultural animals in tropical and subtropical regions (Abdel, 2010). Goats are valuable agricultural animals in the majority of the world's nations. These animals possess a number of distinctive biological traits, including the capacity to efficiently transform their diet into highly nutritious milk and meat and the ease with which they adapt to intensive production methods (Castel *et al.*, 2010; Ibrahim *et al.*, 2020).

2. LITERATURE REVIEW

According to Romano *et al.* (1997), goats are often categorized as seasonal polyestrous breeders, short-day breeders in temperate regions, and breeds that vary seasonally in location. Genetic and environmental variables interact to determine reproductive success (Zarazaga *et al.*, 2005). The creatures are thought to be tiny ruminants with a lengthy mating season and great fertility (Ibrahim, 2004; Amin, 2010). Goat production's reproductive efficiency is constrained by reproductive seasonality (Zarazaga *et al.*, 2005). Synchronizing oestrus in cattle is a reproductive technology which can assist in avoiding the goat's seasonality (Yotov, 2007). Controlling the corpus luteum's secretory activity and ovulation can help farm animals synchronize their estrous cycles. For goats, the best way to achieve this is to manipulate or control the corpus luteum's life span so that the females express estrus roughly at the same time, ensuring that there are enough estrual females available for mating (Zhao *et al.*, 2010). Goats employed many techniques to induce estrus during the anestrus season. Progestagen with GnRH and hCG (Zarazaga *et al.*, 2005; Abid *et al.*, 2019), the abrupt introduction of sexually active bucks (Veliz *et al.*, 2002), and sulpiride as a non-hormonal treatment (Abd & Najlaa, 2023; Al-Mousawe & Ibrahim, 2024) are all effective ways to synchronize ovulation and estrus in small ruminants.

A synthetic counterpart of gonadotrophin-releasing hormone (GnRH), deslorelin is more powerful than the natural hormone and more resistant to proteolysis. Like GnRH, deslorelin stimulates the anterior pituitary to secrete LH and FSH. Nowadays, its main application is in veterinary medicine to get mares and calves to ovulate (Jiang, 2001; Santos *et al.*, 2004; Bartolome *et al.*, 2004; Gobello, 2007). Stewart *et al.* (2023) reported that deslorelin causes overstimulated ovaries in goats out of breeding season. The aim of this study is to induce estrus and ovulation in local goats by using deslorelin treatment.

3. METHODOLOGY

3.1. Animals

This research was conducted on 24 local female goats during anestrus, extended throughout January - July 2023 in Al-Qadisiyah governorate, they received a concentrated meal in

two daily occasion supplements, which included straw and green food, as well as water, and were kept in semi-open shade. The average weight of goats was 35 ± 5 kg, and aged 2.5 to 3 years. The detection of heat was done twice daily by introducing the male to a goat herd and measuring progesterone level to ensure estrus. The progesterone level was less than (1ng/ml). The goats were anestrus, and ultrasonography was used by transabdominal for pregnancy diagnosis.

3.2. Experimental procedure

The goats were divided into 2 groups, each one containing 12 goats, all goats synchronized by vaginal sponges (60mg MAP) for 14 days. The treatment injection withdrawal of sponge. The first group received 0.1 mg of intramuscular deslorelin (BioRelease Deslorelin® (BRD), Australia), and the second group (control) received normal saline.

3.3. Assessment of progesterone assay

To measure the progesterone hormone level, 10 ml of blood was drawn from the jugular vein using vacuum tubes on the day before treatment and every month after estrus. Following centrifugation at 3,000 rpm/10 minutes, serum was extracted and stored in an eppendorf tube at -20°C until it was needed to measure the quantities of the progesterone hormone. The serum was stored at -20°C in an eppendorf tube until the Abbott TECTplus immunoassay analyzer measured the hormone concentrations (Zarkawi & Soukouti, 2001; Li *et al.*, 2019).

3.4. Ultrasonography (B-mode ultrasonography)

The examination of all goats in an experimental study used Ultrasonography B-mode pre and post mating. The examination technique uses an ultrasound tool equipped for the first and second months. A convex probe (3.5-5MHz) is used for ultrasonography during transabdominal transducer to examine the embryo, thoracic, vertebral column, fetal head extremities, placentome, and trunk.

3.5. Statistical analysis

The impact of various components in the research parameters was determined using the Statistical Analysis System-SAS (2010). The significant difference between means was compared in this study using the least significant difference (LSD) test (SAS, 2010).

4. RESULTS AND DISCUSSION

The results of this study were considerably higher ($p \leq 0.05$) in twelve goats in the treatment by deslorelin; ten goats exhibited estrus signs. The estrus induction was 83%, the duration of estrus was 29.5 ± 4.5 hours, the conception rate was 90%, litter size was 101%, and gestation length was 154 ± 2.16 days, compared with the control group treated by normal saline, none appeared any reproductive performance, this result displayed in Table 1.

Table 1. Response of reproductive parameters to treatment with deslorelin (0.1 mg) in goats.

Groups	Incidence of estrus %	Estrus duration (hour)	Conception rate %	Litter size %	Gestation length(days)
G1 deslorelin 0.1 mg	83	29.5 ± 4.5	90	101	154 ± 2.16
G2 normal saline	0	0	0	0	0



When compared to the control group, the progesterone levels in the deslorelin-treated group increased significantly ($p \leq 0.05$) throughout every month (Table 2). As indicated in Table 2,

the progesterone analysis findings for the various months of pregnancy revealed that the fourth month's value (25.34 ± 1.82 ng/ml) differed substantially ($p \leq 0.05$) from the other months.

Table 2. The mean level ($M \pm SE$) of progesterone concentrations (ng/ml) in pregnant goats with deslorelin (0.1 mg) at different gestational periods

Groups	Day (0)	Months				
		1st	2th	3th	4th	5th
G1 deslorelin 0.1 mg	0.67 ± 0.4	8.11 ± 0.55	13.17 ± 0.32	18.45 ± 1.12	25.34 ± 1.82	21.16 ± 1.71
G2 normal saline	0.71 ± 0.4	0.68 ± 0.5	0.65 ± 0.3	0.92 ± 0.41	0.84 ± 0.51	0.74 ± 0.63

When compared to the control group, the ultrasonography results for pregnancy detection in the deslorelin-treated group at 30 and 60 days were 100% significant ($p \leq 0.05$). The current study demonstrates the effectiveness and precision of B mode

ultrasonography in the early identification of pregnancy in Iraqi goats at various gestational ages (30 and 60 days), (Figures 1, 2; Table 3).

Table 3. The pregnancy diagnosis by ultrasonography in treated groups of goats.

Group	No. of animals	0 day	30 days	60 days
G1 deslorelin 0.1 mg	12	0	10 (100%)	10 (100%)
G2 normal saline	12	0	0	0

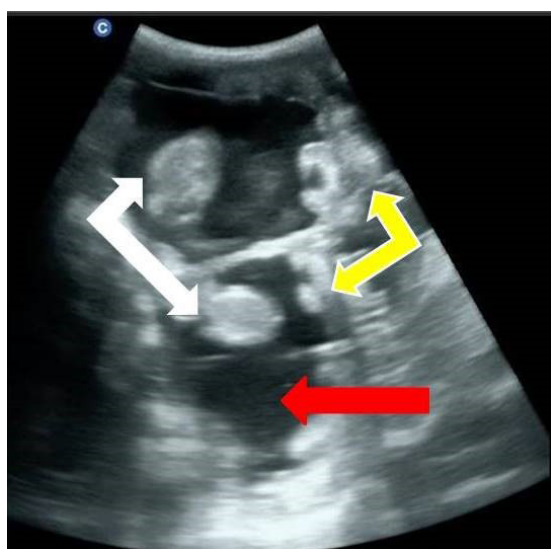


Figure 1. Ultrasonography image that refer to twin pregnancy (white arrow), placenta (yellow arrow), and fetal fluid (red arrow) at day 30

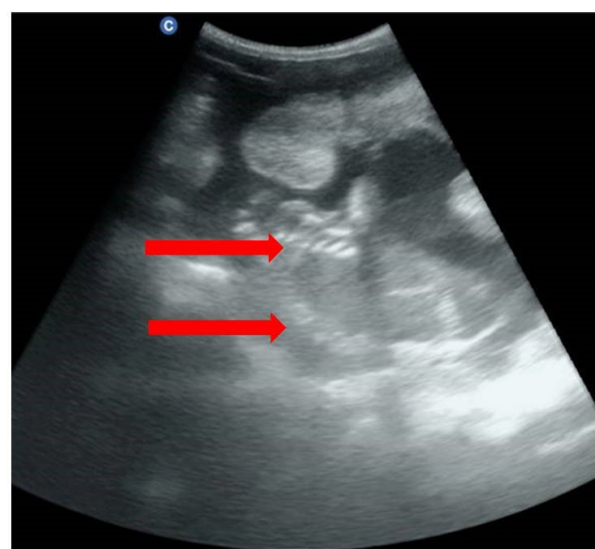


Figure 2. Ultrasonography image that refer to ribs and fetal head at day 60 of pregnancy goat

4.1. Discussion

The findings were substantially higher for the reproductive performance in local Iraqi goats treated with deslorelin during anestrus seasonality. The result of the present study was the incidence of estrus agreement with the result of Stewart *et al.* (2023), who reported the deslorelin treatment causes a higher significance of induced estrus in goats. Garcia *et al.* (2024) reported that deslorelin treatment causes increased synchronization of oestrus and follicle numbers in ewes. Also, this study disagrees with Uslu *et al.* (2012), who reported a dramatically higher rate of pro-oestrus during the use of a

short-acting deslorelin implant. The dominant follicle should ovulate or luteinate after the GnRH therapy causes a sufficient release of follicle stimulating hormone and luteinizing hormone (Glazar *et al.*, 2004). This study agrees with Stewart *et al.* (2023), who reported that deslorelin treatment causes an increased number of cycles and super-ovulatory to achieve pregnancy in goats compared to the control group. A substance called deslorelin acetate was created and authorized to induce ovulation in mares (Ferris *et al.*, 2012). Remarkably, when mares were administered deslorelin (SucroMate) during the seasonal transition phase, their ovulation rates similarly rose



from 4% to 79% (Gomes *et al.*, 2014). Additionally, nursing dairy cows with low body condition ratings had better corpus luteum (CL) function and increased conception rates when a deslorelin implant was added to a timed insemination strategy (Ambrose *et al.*, 1998). Additionally, deslorelin implants tended to reduce pregnancy losses in nursing dairy cows (Santos *et al.*, 2004) and stimulated ovulation in nonlactating dairy cows and heifers (Bartolome *et al.*, 2004). This study's findings contradicted those of Stewart *et al.* (2023), who found that the length of estrus was shorter at 15 to 20 hours and that the duration of estrus varied between deslorelin-treated and saline-treated control goats. Romano *et al.* (2016) reported estrus duration (28.6 ± 5.4 hours) in goats. This result agrees with this present study. Also, Zarazaga *et al.* (2005) reported the estrus duration was 24 - 48 hours; this result agrees with the present study. Also, the duration of estrus was considerably shorter than that stated in a previous study (38 to 40 hours) (Greyling & Van Niekerk, 1991). According to Praharani *et al.* (2016), the gestation duration of Anglo-Nubian goats in Indonesia was 150.25 ± 1.39 days, which similar to Mellado *et al.* (2000), that found 151.4 ± 0.46 days as the length of gestation in goats.

The mean plasma progesterone levels from conception to mid-gestation varied from 2.6 to 10.8 ng/ml, which is consistent with research on local small East African goats (Kanuya *et al.*, 2000). According to the study's findings, progesterone levels rose as the pregnancy progressed and reached their lowest point ($P \leq 0.05$) in the fifth month. This finding is consistent with Musaddin *et al.* (1996), who found that progesterone levels peaked at 24.2 ng/ml near the end of pregnancy and then declined for lowest at the final two weeks. The study's findings indicate that declining in progesterone throughout end of fifth month is caused by the imminence of parturition, which is consistent with Singer *et al.* (2004). The study's findings show that ultrasonography is a useful method for diagnosing early in pregnancy; these findings are consistent with other research (Kähn *et al.*, 1993; Kuru *et al.*, 2018). Ultrasonography's ability to diagnose pregnancy was greatly enhanced in the early stages of the pregnancy. This outcome is consistent with the findings of Muhammad and Aziz (2022); Al-Mousawe and Ibrahim (2024), who documented the importance of ultrasound in ewe pregnancy identification. The transabdominal transducer at B mode employed in the second period (55–56 days) of pregnancy was shown to be extremely accurate for early fetus determination by Lazem *et al.* (2025). It is also the most accurate method of figuring out how many goats have fetuses. This study supports the finding that, after 30 days of mating, transabdominal ultrasonography had a greater accuracy rate for diagnosing pregnancy in Awassi ewes (Aziz & Lazim, 2012). This study supports the findings of Tasal *et al.* (2006), who found that accuracy was greater in days 30–40 of gestation. Using a 5MHz transabdominal probe, Yotov (2005) showed that the Satara Zagora sheep breed had a high pregnancy detection accuracy of 87% at week 4 post-breeding and 98% at day 35 post-mating. Because of its excellent diagnostic criteria and 100% reliability, the ultrasonography testing method on day 50 may be regarded as the gold standard for diagnosing pregnancy (Ardakani *et al.*, 2022).

5. CONCLUSIONS

The current study found that using deslorelin acetate to induce fertile estrus and ovulation in local Iraqi goats outside of breeding season increased the success rate of both processes and that using a transabdominal transducer in B mode during the 30–60 day pregnancy period was accurate for fetal determination.

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