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Estrous induction and conception rate with artificial insemination in Osmanabadi goats

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Abstract

The research work was carried out on 48 Osmanabadi goats and it is divided into 2 groups consists of 24 goats in each group. Group I was studied as a control group without any treatment. On the basis of the effects of treatments shown in each group of animals during which the estrus response, time to onset of estrus, duration of the estrus and conception rates of the synchronized goats from all two groups were studied.

Estrus response was observed from all the two groups of Osmanabadi goats exhibited estrus for which daily twice the teaser buck was used with the aid of buck aperon for the detection of estrus exhibition.

During the research work out of 48 experimental goats estrus response observed in 26 (54.16%). Estrous response in 6 (25%) and 20 (83.33%) goats from group I (Control) and II (GnRH, PGF2 α and GnRH protocol) was observed, respectively.

During the present study mean ($\pm$ S.E.) of time taken for the onset of estrus as 67.33 $\pm$ 1.94, and 36.17 $\pm$ 0.97 hrs, in group I (Control) and II (GnRH, PGF2 α and GnRH protocol), respectively.

The mean ($\pm$ S.E.) of duration of estrus was calculated and reported between the first and the last acceptance of male within the same estrus period in hours. Mean ($\pm$ S.E.) of duration of estrus recorded as 19.83 $\pm$ 1.21 and 35.10 $\pm$ 0.74 hrs in group I (Control) and II (GnRH, PGF2 α and GnRH protocol), respectively.

Pregnancy confirmation was completed on day 35th after artificial insemination by using a real time B-mode portable Ultrasonography machine and conception rate was 16.67% and 70% per cent in group I and II, respectively, while the overall conception rate was recorded as 57.69 per cent in which 15 goats were conceived out of 26 goats.

Keywords: Osmanabadi goat, conception, artificial insemination

Introduction

Artificial oestrus synchronization regulation is useful techniques used effectively to improve reproductive efficiency and intervals of kidding. Breeding timing may be predetermined by using various assisted reproductive technologies. Oestrus synchronization would be more useful in seasonally breeding goats as it confirms a very good rate of conception which ultimately establishes a normal pregnancy. Goat is a spontaneous ovulator with a period of 20-21 days in the estrus cycle, more or less similar to cow. This oestrus period is 1 to 2 days, and ovulation occurs 24-36 hours after estrus onset.

Therefore, induction and estrus synchronization is an important management method that has been used as an aid to Artificial Insemination (A.I) and to reduce the seasonal effects in dairy goat reproduction. During the estrus synchronization system, the use of A.I is encouraged by applying different estrous synchronization protocol. Essentially, there are two methods for the synchronization of estrus in goats: artificial prolongation of diestrus using exogenous progesterone or progestagen, or shortening this process by using luteolytic agents (Bretzlaff and Madrid, 1989) [2]. Synchronization can be done by using ProstaglandinF2 α , GnRH or intravaginal progesterone sponges.

Controlling goat reproduction provides three key advantages: (1) selecting a kidding cycle at a particular season of the year (determined by the availability of forage or selling of

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products), (2) coordination of kidding over a limited period of time (labor control, reduction of kid mortality, homogeneous feeding of mothers and kids) and (3) gene management. Therefore, this research trial is taken up with the following objective for estrus induction and conception rate with GnRH, PGF2 α and GnRH protocol by artificial insemination in Osmanabadi goats.

Materials and Methods

The research work was carried on “Estrus induction and conception rate with artificial insemination in Osmanabadi goats” at Teaching Veterinary Clinical Complex, Instructional Livestock Farm Complex of College of Veterinary and Animal Sciences Parbhani, Private professional goat farms of Parbhani district and in University goat unit of Vasant Rao Marathwada Agriculture University Parbhani.

Selection of experimental animals

A total of 48 healthy Osmanabadi does were selected as experimental animals for the research work. All the does were selected without any genital abnormality irrespective of the ovarian activity and were screened for ruling out early pregnancy by B-mode ultrasonography either by trans-abdominally or trans-rectally.

Schedule of treatment protocol

After selection of experimental animals, total 48 Osmanabadi goats were randomly divided into two groups each consists of 24 does and were maintained under isolation from the remaining goats. The does from these two groups were treated with control breeding protocol with one control group. A total of 48 Osmanabadi does will be divided into 2 groups, each group consisting of 24 does. Group-I comprises of 24 does as control group which will be untreated and in Group-II with ovsynch protocol by administering GnRH@4 μ g I.M on day 0, PGF2 α @125 μ g I.M on day 7th and 2nd GnRH@4 μ g i.m on day 9th.

Reproductive Observations

The estrus response was determined by the number of does in estrus divided by the number of does treated and multiplied by 100 and it is expressed in per cent.

Time to onset of estrous was calculated from the time of the end of treatment to first appearance of estrous signs. The time for exhibition of estrous in terms of hours.

Time of first acceptance of mating to the last acceptance of mating was recorded as duration of estrus and it is expressed in hours.

The conception rate was determined by the number of does pregnant divided by the number of goats inseminated multiplied by hundred and it is expressed in per cent after Artificial insemination was carried.

A real time B-mode portable ultrasonography machine (SSD-500 Aloka Co. Ltd., Japan) was used for pregnancy diagnosis. All the observations of the experiment were recorded systematically as per protocol. The data was properly tabulated and was statistically analyzed by using one-way Anova followed by Duncan test as post hoc test.

Results and Discussion

Out of 24 does 6 does were exhibited the estrous symptoms and the estrous response was 25% in group I (control group). In group II out of 24 does 20 does were exhibited the estrous symptoms and the estrous response was 83.33%. (Table 1). Similar findings were reported by Thombre (2016) [11], Takle,

(2018) [10] and Nur *et al.*, (2013) [6] with 83.33%, 83.33% and 84% of estrous response respectively. Similar results were also reported by Pujar *et al.*, (2016) [7] with 84.61% of estrous response in Osmanabadi goats. In contrary with the present findings Holtz *et al.* (2008) [5], obtained higher estrous response as 96%. Contrary results were also reported by Sneha *et al.*, (2015) [9], Gupta *et al.*, (2019) [3] and Hashem *et al.*, (2015) [4] with the lower estrous response as 75%, 51.72% and 42.85% respectively.

Table 1: Estrous induction protocol for Estrous response

Group	No of goats	No of estrous goats	Estrous response (%)
Group I	24	6	25
Group II	24	20	83.33
Total	48	26	54.16

Table 1 reveals that, out of 48 experimental goat's highest estrous response observed in group II as 83.33% compared to control group.

Teaser buck was used twice daily for the detection of estrous exhibition and time taken from the end of the treatment to the time for exhibition of estrous was recorded as time taken to onset of estrous in hours. In group I mean ($\pm$ S.E.) of time taken for the onset of estrous was 67.33 $\pm$ 1.94 hrs. In group II mean ($\pm$ S.E.) of the time taken for onset of estrous was 47.5 $\pm$ 1.06 hrs. The mean ($\pm$ S.E.) of time taken for the onset of estrous in both the groups varied significantly ($p < 0.01$). Similar findings were observed by Sneha *et al.*, (2015) [9] and Takle, (2018) [10] who quoted mean ($\pm$ S.E.) time for the onset of estrous as 49.92 $\pm$ 1.94hrs and 51.67 $\pm$ 1.58hrs, respectively. In contrary with the present findings Hashem *et al.*, (2015) [4] and Nur *et al.*, (2013) [6] observed lower mean ($\pm$ S.E.) time for the onset of estrous as 34 $\pm$ 2.1 hrs. and 30.9 hrs., respectively. It is evident from table 2 that mean ($\pm$ S.E.) of the time taken for onset of estrous was significantly different in all group ($p < 0.01$).

Table 2: Time taken for the onset of estrous (hrs.) in goats

Groups	No of goats	No of estrous goats	Mean estrous onset interval (hrs.)
Group I	24	6	67.33 $\pm$ 1.94 ^a
Group II	24	20	47.5 $\pm$ 1.06 ^c

a, b, c, d, means with different superscript vary significantly at $p < 0.01$.

It is clear that, the time required for the onset of estrous was lowest in group II does as with the control group. Significant differences in the time taken for the onset of estrous between the groups was observed could be due to selection of experimental goats with the irrespective of ovarian activity and age. These differences could also be due to difference in the time of hormonal treatment and different estrous induction protocol.

Mean ($\pm$ S.E.) of duration of estrous was calculated between the first and last acceptance of male within the same estrous period in hours.

Table 3: Duration of estrous (hrs.) in goats

Groups	No of goats	No of estrous goats	Mean duration of estrous (hrs.)
Group I	24	6	19.83 $\pm$ 1.21 ^a
Group II	24	20	35.10 $\pm$ 0.74 ^c

a, b, c, d, means with different superscript vary significantly at $p < 0.01$

In group II mean ($\pm$ S.E.) of the duration of estrous was 35.10 $\pm$ 0.67 hrs. While the mean duration of estrous in control group was 19.83 $\pm$ 1.21. The mean duration of estrous in both the groups varied significantly ($p < 0.01$). Similar observation was also reported by Thombre, (2016) ^[11] who observed the mean ($\pm$ S.E.) of the duration of estrous as 39.6 $\pm$ 0.56hrs. In contrast with the present findings lesser mean ($\pm$ S.E.) of the duration of estrous was observed by Riaz *et al.*, (2011) ^[1] and Nur *et al.*, (2013) ^[6] as 24 $\pm$ 3.7 hr. and 29.4 hr., respectively. The present findings are also not in agreement with the Takle, (2018) ^[10] who observed higher mean ($\pm$ S.E.) of the duration of estrous as 43.42 $\pm$ 0.57hrs. It is evident from table 3 that mean ($\pm$ S.E.) of the duration of estrous was significantly varied in all group ($p < 0.01$).

The results variations may be due to individual differences within same species, change in the treatment protocol, duration in the administration of hormone protocol timings in the above-mentioned experiment. The differences in the observation of duration of estrous reported by earlier author may be because of breed variation, seasonal variation, age differences. From the present findings, it is clear that, duration of estrous was observed highest in group II as compared to control group of goats during the research work.

Pregnancy conformation was done by using a real time B mode ultrasonography machine on day 35th after artificial insemination to obtain the conception rate. The conception rate was determined by the number of does pregnant divided by the number of goats inseminated multiplied by hundred and it is expressed in per cent.

Out of 6 does inseminated one was found pregnant with 16.67% as conception rate in group I (Control). In group II out of 20 does inseminated 14 were found pregnant with 70.00% as conception rate (Table-4). Similar findings were reported by Riaz *et al.*, (2011) ^[1], Takle, (2018) ^[10] and Ahmad *et al.*, (2012) with the conception of 60% by using ovsynch protocol. In contrast to this higher conception rate was observed by Thombre, (2016) ^[11] as 83.33%.

The variation of conception rate with the present findings reported by earlier author could be due to difference in the breeds, drugs, physiological stage, seasonal variation, endocrine profile as well as geological difference which may causes variation in the conception rate.

Table 4: The conception rate in goats on day 35th after A.I.

Groups	No of goats	No of estrous goats	No of goats conceived	Conception rate (%)
Group I	24	6	1	16.67
Group II	24	20	14	70
Total	48	26	15	57.69

From the study it reveals that the group II was found more efficient than the control group of goats with 70% of conception.

Summary and Conclusion

Out on 48 Osmanabadi goats equally divided into 2 groups comprising of 24 goats in each group. Group I was studied without any treatment and served as a control group. The observations were analyzed on the basis of the effects of treatments shown in each group of animals during which the estrus response, time to onset of estrus, duration of the estrus and conception rates of the synchronized goats from all two groups were studied.

Estrus response was observed and reported from all the two groups of Osmanabadi goats exhibited estrus for which daily

twice the teaser buck was used with the aid of buck aperon for the detection of estrus exhibition.

During the present research work overall estrus response out of 48 experimental goats observed in 26 (54.16%). Estrus response was observed in 6 (25%) and 20 (83.33%) goats from group I (Control), and II (GnRH, PGF2 α and GnRH protocol), respectively.

During the present study mean ($\pm$ S.E.) of time taken for the onset of estrus as 67.33 $\pm$ 1.94, and 36.17 $\pm$ 0.97 hrs. in group I (Control) and II (GnRH, PGF2 α and GnRH protocol), respectively.

The mean ($\pm$ S.E.) of duration of estrus was calculated and reported between the first and the last acceptance of male within the same estrus period in hours. Mean ($\pm$ S.E.) of duration of estrus recorded as 19.83 $\pm$ 1.21 and 35.10 $\pm$ 0.74 hrs. in group I (Control) and II (GnRH, PGF2 α and GnRH protocol), respectively.

During the research trial pregnancy confirmation was completed by using a real time B-mode portable Ultrasonography machine on day 35th after artificial insemination and achieved conception rate as 16.67% and 70% per cent in group I and II, respectively, while the overall conception rate was recorded as 57.69 per cent in which 15 goats were conceived out of 26 goats.

Conclusion

- Estrous Induction protocol used with Artificial Insemination in Osmanabadi goats, group II showed 83.33% estrus response with less time taken for the onset of estrous as compared with the control group.
- In group II goats by using GnRH, PGF2 α and GnRH protocol, prolonged duration of estrous was observed
- Conception rate was higher (70.00%) in group II which was found more efficient than the control group.

Conflict of Interest

Not available

Financial Support

Not available

Reference

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