RESEARCH ARTICLE

Efficiency of Different Estrus Synchronization Protocols in Surti Goats

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ABSTRACT

A total of 54 adult non-pregnant Surti goats were selected and randomly divided into three equal groups (n=18 each). Two groups were put under estrus synchronization protocols, viz., Double PGFα protocol (Inj. Dinoprost 12.5 mg, i/m, 11 days apart with natural breeding from 72-144 hours of second PG inj.) and NC Synch protocol (PG 12.5 mg - GnRH 0.004 mg - PG 12.5 mg - GnRH 0.004 mg on days 0, 8, 15 and 18, respectively with natural breeding during 19-21 days) using standard management practices and 3rd group was kept as untreated control. All the goats were dewormed before initiation of treatment. The estrus response (100% each), duration of estrus, pregnancy rate at 60 days post-breeding (55.55 vs. 44.44 and 55.55%), and kidding rate (100% each) were statistically same in control and synchronized goats. However, twins were in almost 50% of kidding under the NC Synch group compared to 25% in Double PG protocol and 40% in the control group, with almost 100% kid survival till weaning. Thus, NC Synch Protocol was better in terms of pregnancy rate (55 vs. 44%) and fecundity (1.5 vs. 1.0) over double PGFα protocol, and even untreated control goats.

Key Words: Estrus Synchronization, Kidding & twining rate, Kid survivability, NC Synch, Pregnancy rate, Surti Goats.

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INTRODUCTION

Goats are primarily kept for meat, milk and contribute substantially to household income and food security in the rural areas. The profitability of goat enterprise depends on the successful rearing of more number/percent of kids on a goat farm. Multiple birth rate, as well as the viability of kids, is more important in goat to increase the population as well as contribute to household income (Zarkawi and Ai-Daker, 2013). Synchronization of estrus is a useful tool for improving and maintaining the production of milk and meat as well as reducing the labor cost in goat farms and to do easy management of goat farm (Holtz, 2005; El-Sherry et al., 2012; Pujar et al., 2016; Llanes et al., 2019). Literatures in respect of estrus synchronization protocols on various breeds of goats (Lima et al., 1997; Addalla et al., 2014; Andrabi et al., 2015) prompted us to work in that direction on Surti goat breed with the objectives to study the efficiency of estrus synchronization protocols in terms of estrus response, time to onset of estrus, duration of estrus, and its effect on kidding rate, birth type, mortality rate, and kid viability till weaning in Surti goats.

MATERIALS AND METHODS

For the present study, 54 adults non-pregnant Surti goats were selected from the University flock at Ramna Muvada (Gujarat) during May and September and were divided equally into three groups (n=18). Two groups were put under estrus synchronization protocols using standard management practices, and the 3rd group was kept as an untreated control. All the goats were dewormed before initiation of treatment. The following protocols were used during the study over one year.

Group-I (Double PGFα Protocol)

Eighteen adult healthy non-pregnant goats selected were administered twice with Inj. PGFα (Dinoprost tromethamine, Lutalyse, Zoetis) twice @ 12.5 mg i/m on day 0 and day 11. All the goats were observed for signs of estrus and kept with bucks for three days for natural breeding after 72 hrs of second PGFα injection.

Group-II (NC Synch protocol)

The other 18 adults healthy non-pregnant Surti goats were administered with Inj. PGFα (Dinoprost tromethamine, Lutalyse, Zoetis) @ 12.5 mg i/m on day 0, followed by Inj. Buserelin acetate (Receptal, MSD) @ 0.004 mg i/m on day 8, second Inj. of PGFα @ 12.5 mg i/m on day 15, and Inj.
Buserelin acetate @ 0.004 mg on day 18. All the goats were then kept with bucks for 3 days for natural breeding after last inj. of Buserelin acetate (Bowdridge et al., 2013).

**Group-III (Untreated Control)**

Eighteen adult healthy non-pregnant goats were kept with an intact fertile buck for one month without giving any treatment as a control group.

Observations on estrus response, time to onset of estrus, duration of estrus and pregnancy rate, kidding rate, birth type, mortality rate, and kid viability till weaning were recorded. The data were suitably tabulated and analyzed.

**Results and Discussion**

The results of the study are presented in Table 1. During the entire study of one year, 54 goats were selected for the experiment in two phases and were equally divided into three groups. The time of onset of estrus after last PGF₂α injection was 52.33 ± 1.15 hrs in double PGF₂α protocol and 53.56 ± 1.20 hrs in NC Synch protocol. The estrus symptoms were detected in all goats (100 %) under both the protocols, including control as the acceptability of male. The 100% of animals found in estrus with double PGF₂α protocol was similar to that reported by Amarantidis et al. (2004), Compton (2009), and Fonseca et al. (2012) in different breeds. Furthermore, Esteves et al. (2013), Sumeldan et al. (2015), and Abera (2017) observed lower estrus response (80.00, 79.30 and 81.25%) as compared to present finding. Estrus induction in 100% could be due to the breeding season as the goats of the control group also showed natural estrus during the experimental period.

In this study, the interval to estrus after last PGF₂α injection (52.33 ± 1.15 hr) was similar with the findings of Fonseca et al. (2012) and Esteves et al. (2013), while Amarantidis et al. (2004) and El-Sherry et al. (2012) reported higher (59.5 ± 4.2 hr) and lower (37.2 ± 5.3 hr) interval to estrus, respectively with double PGF₂α protocol. The interval to estrus observed in NC Synch protocol (53.56 ± 1.20 hr) was similar to the finding (54.00 ± 10.00 hr) of Bowdridge et al. (2013). Further, Compton (2009) and Bowdridge et al. (2013) reported lower estrus response (73 and 83 %) following NC Synch protocol, while Holtz (2005) and Pujar et al. (2016) reported 100 and 91.66 % response following Ovsynch protocol.

The duration of estrus in double PGF₂α protocol was 28.72 ± 0.54 hrs and in NC Synch protocol 29.06 ± 0.45 hrs. The present finding of a duration of estrus with double PG protocol was in agreement with the result of Esteves et al. (2013). Pujar et al. (2016) observed a longer duration of estrus (38.00 ± 5.0 hr) in the Ovsynch protocol.

During an ultrasonographic evaluation at 60 days after breeding, eight (44.44%) and ten (55.55%) goats were pregnant in groups I and II, respectively, and ten goats in the control group (55.55%) also revealed pregnancy. The pregnancy rates obtained with double PG and NC Synch protocols were comparable with the findings (39±11 and 50±11%) of Llanes et al. (2019), while Compton (2009) recorded higher pregnancy rates of 77 and 73%, respectively, with these two protocols.

Furthermore, Amarantidis et al. (2004), Andrabi et al. (2015) and Abera (2017) observed higher pregnancy rate (80.0, 71.4 and 61.5 %), while Sumeldan et al. (2015) reported lower (30.0%) pregnancy rate with double PG protocol. Similarly, Pujar et al. (2016) and Bowdridge et al. (2013) also recorded higher pregnancy rates of 75 and 68 %, respectively, with NC Synch protocol compared to present findings.

All the goats (100%) confirmed pregnant at 60 days after breeding kidded normally. This kidding rate was comparable to that obtained by Bowdridge et al. (2013) and almost double than 53 % observed by Compton (2009). In group I, out of eight goats that kidded, six goats gave birth to a single kid (75%), while two goats (25%) gave birth to twins. This was in agreement with the findings of Shivkumar (1993), who reported 85.71 % singles and 14.29 % twins. In group II, out of ten goats that kidded, five goats gave birth to single kid (50%) and five goats (50%) gave birth to twins. Zarkawi and Al-Daker (2013) reported comparatively higher (57.14%) and lower (42.86 %) single and twins birth in goats synchronized with intravaginal sponge method. Sen and Onder (2016) also reported lower frequency of single and twins (42 and 33 %) with sponge method. In control group, ten goats that kidded, six goats gave birth to single kid (60%) and four goats (40%) gave birth to twins. None of the above goats gave birth to triplets.

Total twenty eight goats gave birth to 39 kids. All goats were kidded between 6.00 am to 6.00 pm. Amongst 39 kids, only 1 kid of control group died before weaning (at the age of 65 days). Survival rate of kids at the time of weaning in group I and II were 100%, while in control group, it was 92.86%. Weaning rate (100%) of the present study was close to that of Bowdridge et al., (2016).
(90 and 85 %) reported by Farrag et al. (2010) and Abdalla et al. (2014). Sen and Onder (2016) also reported 94.12 % kid survival rate at the time of weaning in goats synchronization by intra-vaginal sponge method.

**Conclusion**

From the study it was concluded that the estrus response, pregnancy rate and kidding rate were statistically same in control and synchronized goats, yet NC Synch protocol was better in terms of pregnancy rate and fecundity over double PGF2α and even untreated control goats with 50% of twin kidding. The results were inconclusive for double PG group, hence further study is warranted particularly of infertile goats to find out beneficial effect of these synchronization protocols in goats.

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**References**


