

ESTRUS SYNCHRONIZATION RESPONSE AND CONCEPTION RATE FOLLOWING IVS AND FIXED TIME INSEMINATION IN GOAT

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ABSTRACT

The study was conducted to design Intravaginal sponge(IVS) and speculum suitable for Assam local goats (and its crossbreds), to study the relative estrus synchronization response to three different progesterone concentrations followed by PMSG administration and the conception rate following artificial insemination (AI). A total of 24(twenty four) normal cyclic adult non-pregnant female goats maintained at Goat Research Station, Assam Agricultural University, Byrnihat, constituted the experimental animals. The animals were divided into four groups viz, group A₀, A₁, A₂ and A₃ with six animals in each group. Animals of group A₀ (control group) received 0 mg progesterone and A₁, A₂ and A₃ groups received 100, 200 and 300 mg Progesterone Impregnated Intravaginal Sponge and kept in situ for 14 days followed by administration of 200 IU PMSG I/M on the day of Progesterone Impregnated Intravaginal Sponge removal. Artificial insemination was done after 12 hours from the onset of estrus. Blood samples were collected from each of the animals on 0, 7, 14, 15, 16, 26, 36, 46, 56, 66 and 76 days. A 100 per cent synchronized estrus was recorded in the three treatment groups and natural estrus of 16.66 per cent in the control group (A₀). A conception rate of 83.33 percent was recorded in the does of A₁, A₂ and A₃ groups after Artificial insemination but there was no conception in the animals of control group A₀. The serum progesterone profile at the start of the study was 1.197±0.05, 1.23±0.03, 1.24±0.04 and 1.28±0.04 ng/ml in A₀, A₁, A₂ and A₃ groups respectively and at the 14th day ie., removal of the Progesterone Impregnated Intravaginal Sponge was 1.453±0.10, 3.17±0.04, 3.88±0.02 and 4.66±0.05 ng/ml in A₀, A₁, A₂ and A₃ groups respectively. On the day of estrus the progesterone profile at day 1 observation following AI in pregnant does was 0.25±0.01, 0.27±0.01 and 0.36±0.02 ng/ml in A₁, A₂ and A₃ groups whereas, it was 1.17±0.18, 0.62, 0.248 ,and 0.317 ng/ml in non-pregnant goats of A₀, A₁, A₂ and A₃ groups respectively. At pregnancy, ie., 60 days, the level of serum progesterone was 6.00±0.37, 7.01±0.09 and 7.59±0.14 ng/ml in A₁, A₂ and A₃ groups which showed an increasing trend from the day of estrus whereas, in non-pregnant animals, it was 1.24±0.15, 0.997, 0.967 and 0.897 ng/ml in A₀, A₁, A₂ and A₃ groups respectively at 60 days of observation. The study revealed IVS treatment effective in estrus synchronization.

Key words : Estrus synchronization response, conception rate, goat, IVS.

Optimum reproductive efficiency is a key factor in the economy of livestock industry. The expanded popularity of meat production has lead to increased interest in reliable methods to induce estrus in goats. With new technology, producers are able to more efficiently use complementary

techniques for reproductive management, like the use of progestagen impregnated vaginal devices (sponges) as useful tools to manage reproduction irrespective of season and to the application of timed artificial insemination (AI). The use of Intra vaginal sponges with progesterone gives better

result and it enhances the reproductive efficiency in goat in terms of kidding performance⁷.

A total of twenty four (24) numbers of adult non-pregnant cyclic female Assam local goats and is crossbreds constituted the experimental. They were kept under semi-intensive system of rearing and feeding as per the standard farm practices followed in Goat Research Station, AAU, Byrnihat. The animals were randomly divided into four (4) groups comprising of six(6) animals in each group, namely, A₀, A₁, A₂ and A₃, where A₀ is the control group received 0 mg progesterone and A₁, A₂ and A₃ received 100, 200 and 300 mg progesterone respectively. Twenty four vaginal sponges were prepared by cutting the sponges into 6.5 cm in length and 2.4 cm in diameter in cylindrical shape and tied with cotton thread for the eventual withdrawal of the sponge from the anterior vagina.

The sponges were sterilized in autoclave at 15 lb pressure for 15 minutes. A total of eighteen (18) vaginal sponges were impregnated with progesterone (SIGMA) in three sets comprising of 6 sponges in a set in such a way so that each sponge in a set contained 100, 200, or 300 mg of progesterone. Six (6) sponges were kept without medication for the animals of the control group A₀. The PVC (Poly Vinyl Chloride) vaginal speculum (Fig.3.2), measuring 22 cm in length, 1.5 cm in internal diameter and 2 cm outer diameter was fabricated. Prior to insertion of PVC speculum into the vagina of the goat, the sponge was introduced into one of the sterilized PVC speculum. After washing and drying the vulva of the goat, the speculum containing the sponge was slowly and gently introduced upto the anterior vagina. Then with the help of a glass plunger measuring 43 cm in length and 1.2 cm in diameter the sponge was pushed from the speculum into the anterior vagina of the goat and kept in situ for 14 days.

All the experimental animals including animals of the control group were closely observed for the occurrence of estrus by using a vasectomised buck to move around the animals

round the clock. Estrus was detected on the basis of behavioural and physical signs viz., mucous discharge from the vagina, wagging of tail, frequent urination etc. First acceptance of the male by the female was considered as the onset of estrus and the rejection of the male by the female was considered as the end of estrus. The three treatment groups of goat i.e. A₁, A₂ and A₃ received the sponges containing 100,200 and 300 mg of progesterone respectively, while the control group received non medicated sponges. The sponges were kept in situ for 14 days. After 14 days, the sponges were removed and PMSG (Folligon, Intervet) at the rate of 200 IU per animal was injected intramuscularly in the animals of treatment groups.

Once the heat was detected the female were bred through Artificial Insemination at 12 hours from the onset of estrus. The conception rate following Artificial Insemination in the synchronized goat was determined by progesterone estimation by RIA method.

The estrus synchronization response in goats of group A₁, A₂ and A₃ receiving Intravaginal sponge containing 100,200 and 300 mg of progesterone followed by 200 IU of PMSG and in control group A₀(0 mg progesterone) was recorded as 100.00 ,100.00, 100.00 and 16.66 per cent respectively. The conception rates were recorded as 83.33, 83.33, 83.33 per cent in the treatment groups A₁, A₂ and A₃ and 0.00 per cent in the control group A₀ (Table 1)

In the present study, the estrus synchronization response was found to be 100 per cent in all the animals of treatment groups i.e. group A₁, A₂ and A₃ receiving progesterone impregnated vaginal sponge containing 100,200 and 300 mg of progesterone respectively followed by 200 IU of PMSG. In control group i.e. A₀ out of six animals only one (16.66j—) animal came into estrus.

The estrus synchronization response recorded in the present study was in close

agreement with that reports in goat following treatment with 45 mg FGA + 600 IU PMSG and 60 mg MAP + 600 IU PMSG⁶. 100 per cent estrus response in goats treated with PMSG + HCG following insertion of veramix vaginal sponges containing 60 mg of medroxy progesterone acetate for 18 days⁴. 90.0 and 100.0 per cent estrus response in Suffolk and Suffolk-crossed ewes when synchronization of estrus was attempted with FGA and CIDR in the breeding season³. 84.21 and 96.67 per cent estrus response in ewes treated with 20 mg of FGA and CIDR containing 0.3g of progesterone for 12 days in both the groups followed by an intramuscular injection of 300 IU of eCG at the removal of intravaginal sponges and devices^{2,7}. A lower estrus response of 85.71 per cent was reported following synchronization of estrus in goats treated with CIDR containing 0.332

g of natural progesterone and 600 IU of PMSG⁶. Synchronous estrus response of 72 per cent was reported in ewes on treatment using 40 mg fluorogesterone acetate or 60 mg medroxy progesterone acetate administered by intravaginal sponges¹. Only 60 per cent estrus response was reported in goat following synchronization with 12.5 mg progesterone intramuscularly for 7 days and 400 IU PMSG after withdrawal of vaginal sponges⁵. Its variation in the estrus response may be due to the difference in the dosage and duration of hormone used, breed, nutrition and season. Progesterone impregnated intravaginal sponge developed indigenously for implantation along with PMSG injection done during the present study for synchronization of estrus could be constructed to be efficient since all the goats subjected to treatment exhibited synchronous estrus.

Table 1. Estrus synchronization (ES) response, conception rate (CR) and Serum progesterone profile (Mean ±SE) of Non Pregnant (NP) and Pregnant (P) goats at different days following AI

Days	ES (%)	CR (%)	Serum Progesterone (ng/ml)		Pregnancy (%)
			NP	P	
1	100	100	0.00 ± 0.00	0.00 ± 0.00	0
2	100	100	0.00 ± 0.00	0.00 ± 0.00	0
3	100	100	0.00 ± 0.00	0.00 ± 0.00	0
4	100	100	0.00 ± 0.00	0.00 ± 0.00	0
5	100	100	0.00 ± 0.00	0.00 ± 0.00	0
6	100	100	0.00 ± 0.00	0.00 ± 0.00	0
7	100	100	0.00 ± 0.00	0.00 ± 0.00	0
8	100	100	0.00 ± 0.00	0.00 ± 0.00	0
9	100	100	0.00 ± 0.00	0.00 ± 0.00	0
10	100	100	0.00 ± 0.00	0.00 ± 0.00	0
11	100	100	0.00 ± 0.00	0.00 ± 0.00	0
12	100	100	0.00 ± 0.00	0.00 ± 0.00	0
13	100	100	0.00 ± 0.00	0.00 ± 0.00	0
14	100	100	0.00 ± 0.00	0.00 ± 0.00	0
15	100	100	0.00 ± 0.00	0.00 ± 0.00	0
16	100	100	0.00 ± 0.00	0.00 ± 0.00	0
17	100	100	0.00 ± 0.00	0.00 ± 0.00	0
18	100	100	0.00 ± 0.00	0.00 ± 0.00	0
19	100	100	0.00 ± 0.00	0.00 ± 0.00	0
20	100	100	0.00 ± 0.00	0.00 ± 0.00	0
21	100	100	0.00 ± 0.00	0.00 ± 0.00	0
22	100	100	0.00 ± 0.00	0.00 ± 0.00	0
23	100	100	0.00 ± 0.00	0.00 ± 0.00	0
24	100	100	0.00 ± 0.00	0.00 ± 0.00	0
25	100	100	0.00 ± 0.00	0.00 ± 0.00	0
26	100	100	0.00 ± 0.00	0.00 ± 0.00	0
27	100	100	0.00 ± 0.00	0.00 ± 0.00	0
28	100	100	0.00 ± 0.00	0.00 ± 0.00	0
29	100	100	0.00 ± 0.00	0.00 ± 0.00	0
30	100	100	0.00 ± 0.00	0.00 ± 0.00	0
31	100	100	0.00 ± 0.00	0.00 ± 0.00	0
32	100	100	0.00 ± 0.00	0.00 ± 0.00	0
33	100	100	0.00 ± 0.00	0.00 ± 0.00	0
34	100	100	0.00 ± 0.00	0.00 ± 0.00	0
35	100	100	0.00 ± 0.00	0.00 ± 0.00	0
36	100	100	0.00 ± 0.00	0.00 ± 0.00	0
37	100	100	0.00 ± 0.00	0.00 ± 0.00	0
38	100	100	0.00 ± 0.00	0.00 ± 0.00	0
39	100	100	0.00 ± 0.00	0.00 ± 0.00	0
40	100	100	0.00 ± 0.00	0.00 ± 0.00	0
41	100	100	0.00 ± 0.00	0.00 ± 0.00	0
42	100	100	0.00 ± 0.00	0.00 ± 0.00	0
43	100	100	0.00 ± 0.00	0.00 ± 0.00	0
44	100	100	0.00 ± 0.00	0.00 ± 0.00	0
45	100	100	0.00 ± 0.00	0.00 ± 0.00	0
46	100	100	0.00 ± 0.00	0.00 ± 0.00	0
47	100	100	0.00 ± 0.00	0.00 ± 0.00	0
48	100	100	0.00 ± 0.00	0.00 ± 0.00	0
49	100	100	0.00 ± 0.00	0.00 ± 0.00	0
50	100	100	0.00 ± 0.00	0.00 ± 0.00	0
51	100	100	0.00 ± 0.00	0.00 ± 0.00	0
52	100	100	0.00 ± 0.00	0.00 ± 0.00	0
53	100	100	0.00 ± 0.00	0.00 ± 0.00	0
54	100	100	0.00 ± 0.00	0.00 ± 0.00	0
55	100	100	0.00 ± 0.00	0.00 ± 0.00	0
56	100	100	0.00 ± 0.00	0.00 ± 0.00	0
57	100	100	0.00 ± 0.00	0.00 ± 0.00	0
58	100	100	0.00 ± 0.00	0.00 ± 0.00	0
59	100	100	0.00 ± 0.00	0.00 ± 0.00	0
60	100	100	0.00 ± 0.00	0.00 ± 0.00	0

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Estrus synchronization response and conception rate

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