

Superovulatory response and embryo production potential of Jakhrana goats treated with porcine follicle stimulating hormone

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Received : March 12, 2004

Accepted : November 8, 2004

ABSTRACT

Six regularly cycling adult Jakhrana goats were superovulated during mid to late luteal phase of oestrous cycle by administering 16 mg FSH-P (Sigma Laboratories, USA) I/M in reducing dose schedule over a period of 3 days at 12 hours interval. Oestrus was synchronized by using Lutalyse (Dinoprost tromethamine, Upjohn, USA) @7.5 mg I/M per goat or ½ Crestar implant (Norgestomet +Oestradiol Valerate Intervet, Holland). Goats exhibiting oestrus after treatment were naturally bred at the onset of oestrus and 12 hours later. Each responded goat received hCG (Chorulon, Intervet, Holland) @ 500 IU I/V 10-12 hours after the onset of synchronized oestrus to enhance ovulatory rate. Five of six (83.33%) goats responded to oestrus synchronizing treatments within 24-36 hours (average 31.20±2.62 hrs.) of treatment withdrawal and stayed in oestrus for 24 - 48 hours (average 31.20±4.29 hrs). Responders were subjected to mid-ventral laparotomy after 74-84 hours of oestrus onset to flush embryos from oviducts. Average ovarian response and transferable embryo recovery were 9.40±2.53 and 5.20±2.71, respectively. One donor showed exceptionally good embryo recovery of 17 embryos. Unruptured follicles averaged 5.40±1.34. Recovered embryos were transferred in 5 recipients and remaining were used for freezing. Study revealed the feasibility of using this technique to enhance kidding rate in this unexplored goat breed.

Keywords: Jakhrana goats, lutalyse, crestar, superovulation, FSH-p, hCG, embryo recovery

Jakhrana is a descript goat breed of western semi arid zone of India and found in Jakhrana village of Behror tehsil and surrounding areas in Alwar district of Rajasthan. It plays an important role in providing livelihood to rural mass of that region. It is a dual purpose breed of medium size having average milk yield of 1.50 to 2.00 kg. under field conditions. It may perform better under stall feeding (Annual Report, CIRG 2000-2001). Research work on its various facets of reproduction has been reported (Goel, 1998). Twinning is not common (15-20%) as ovulation rate of 1.33±0.11 has been reported in this breed (Goel and Agrawal, 2003). Considering its production performance, there is enough scope to augment its reproduction rate by employing reproductive tools like superovulation and embryo transfer, if successful. Work on these aspects has not been extensively carried out in this breed. Therefore, this experiment was planned to study superovulation and embryo production potential by using gonadotropin of pituitary origin.

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MATERIALS AND METHODS

A herd of Jakhrana goats maintained at institute experiment farm was monitored for oestrus cyclicity using aproned bucks at regular intervals of 12 hours. Goats were maintained under semi - intensive system of management and were provided with supplementary feeding of concentrate mixture @ 250 gms /goat /day and *ad-lib* straw and seasonal greens in addition to 4-6 hours daily grazing in the forest area of the institute. From this herd a group of six adult normal cycling Jakhrana goats of nearly similar age group were selected on the basis of regularly in oestrus expression. Goats were subjected to treatment during the period of peak oestrus activity i.e. June to August. Goats were oestrus synchronized using Lutalyse (Dinoprost tromethamine, Upjohn, USA, @ 7.5 mg I/M per goat in single dose schedule or ½ Crestar implant (Norgestomet+Oestradiol Valerate, Intervet, Holland) for 9 days S/C. Goats exhibiting oestrus were naturally bred initially at the onset of oestrus and 12 hours interval by superior buck.

Superovulatory treatment was initiated during mid to late lateral phase of oestrous cycle using 16 mg FSH-P (Sigma Laboratories, USA) I/M in reducing dose schedule

(3.5x2, 2.5x2, 2x2) over a period of 3 days at 12 hours interval. Each responded goat was administered hCG (Chorulon Intervet, Holland) @ 500 IU I/V at 10-12 hours after the onset of synchronized oestrus to facilitate ovulation. Responders were subjected to mid-ventral laparotomy at 72-84 hours post - oestrus to recover embryos. Prior to flushing of genitalia (oviducts) by passing D-PBS+0.4 BSA from utero-tubal junction, super ovulatory response in terms of corpora lutea and un ruptured follicles were recorded. Flushing media was introduced through utero-tubal junction and collected from fimbrial end of each oviduct. Flushings were immediately examined under stereo-zoom microscope (50x) for the presence of embryos and their quality.

RESULTS AND DISCUSSION

Five out of six (83.33%) Jakhkana goats responded to oestrus synchronization treatment within 24-36 hours (average: 31.20±2.62 hrs) of treatment withdrawal. Responder goats remained in oestrus for 24 to 48 hours (average: 31.20±4.29 hrs). The average super ovulatory response and transferable embryo recovery in donor goats were 9.40±2.53 and 5.20±2.71, respectively. Among 5 goats, from one donor exceptionally good embryo recovery of 17 embryos was achieved. Embryos of various developmental stages (4°C-16°C) were recovered. A moderate number of un ovulated follicles were also recovered (5.40±1.34). Recovered embryos were transferred in oestrus synchronous recipients and also used for freezing.

Multiple ovulations followed by collection of embryos are an essential step in embryo transfer aimed to augment reproduction efficiency of superior animals. A response of 83.33% for oestrus synchronization in the present study is better (65.62%, 66.12% and 70.10%) than obtained by Goel *et al.* (1995) in indigenous goats, Ishwar and Pandey (1992) in Black Bengal goats and Noshari *et al.* (1995) in Boer goats, respectively. Our findings are comparable (87.00%) with the findings of Holtz and Sohnrey (1992) when Crestar ear implants were used. Mean un ruptured follicles reported (5.40±1.34) in our study is comparatively lesser than that observed by Patel *et al.* (2002) in Surti goats during treatment with PMSG. It was probably due to the use of FSH-P in present study. Mean super ovulatory response (9.40±2.53) in terms of established corpora lutea in our study is favorably comparable to Jamunpari goats (Goel and Agrawal, 1990) and Boer goats (Noshari *et al.*, 1992) treated with similar super ovulatory protocols. On the contrary, present response is comparatively

lower than reported by Mahmood *et al.* (1991) in Pashmina goats and Baril and Vallet (1990) in Alpine goats.

Mean embryo recovery (5.20±2.71) in our study is well comparable to that reported by Goel and Agrawal (1990) in Jamunpari and Goel (1998) in the same breed. Embryo recovery was higher to earlier reports of Mahmood *et al.* (1991) in Pashmina goats of Indian origin. The recovery of 17 goat quality embryos from a single donor goat in our study is highest reported so far in this breed and possibly in species also.

Variations in super ovulatory response and embryo recovery reported by earlier workers might be due to difference in dose level of exogenous hormones used, breed, and season of experiments as well individual response. It is concluded from the study that the technique of super ovulation and embryo transfer can be used as a biotechnological tool to enhance reproduction rate in Jakhkana goats.

ACKNOWLEDGEMENT

Authors are thankful to the Director, CIRG, Makhdoom, Farah (Mathura) UP for providing necessary facilities for the present study.

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THE INDIAN JOURNAL OF ANIMAL REPRODUCTION
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