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Effect of two dose level of FSH on superovulatory response, total and viable embryo recovery in Holstein Friesian x Sahiwal crossbred cows with repeated flushing

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ABSTRACT

The Holstein Friesian x Sahiwal (HF x S) donor cows were selected randomly and distributed in to two groups (A&B). A total of 32 & 42 embryo flushings in group A & B respectively were performed superovulation was achieved by treatment with 200 mg FSH in group A and 400 mg FSH, in group B. the schedule comprised of 8 equal doses between day 9 and 11 post estrus (day 0 is day of standing estrus). Estrus was induced by injecting single dose of Prostaglandin F_2a 48 hr. from first FSH injection. Artificial insemination (AI) was carried out with frozen semen on day 7 post estrous. Donors were flushed non surgically and revealed no embryo recovery in 5 animals (15.63%) of group A and 7 animals (16.67%) of group B. The analysis was done with respect to dose regimen (50% Vs 100%) and repeated flushings (1st, 2nd and 3rd flush) within the group and between the groups. The mean of ovulation, anovulatory follicles, and viable embryo recovery (VE) with respect to the two FSH regimen revealed no significant difference ($P<0.05$). With regard to the repeated flushings in A group, there was significant reduction in total embryo recovery (TE) in 1st and 3rd flush, while as there was no difference in other parameters within the group. Similarly in B group, there was a significant reduction in VE in 1st and 3rd flush, while there was no difference in other parameters within the group. Comparing the differences in 1st, 2nd and 3rd flushing of both groups, there was no significant difference in all parameters. It was concluded that the cost of flushing can be reduced in HF x S donors through reduction in dose of FSH without affecting the results.

Key Words: FSH, Superovulation, Embryo recovery, Flushing, Cow

In 80's, embryo transfer technology was adopted by many institutes for production of high pedigree calf by selection of the best dam and the best sire. However one of the major constraints for the adoption of embryo transfer technology in developing countries has been its higher cost. Though this technology was standardized in India in late 80's, but has not been fully exploited in breeding programme. Considering the reduction in generation interval and production of more number of full and half sibs for genetic evaluation, this technique was considered to be a boon for farms. But due to the unavailability of materials required for ETT in local market, they need to import material and resulted in increased cost of implementation was very high. FSH contribute maximum towards the cost of ETT. This study was conducted to reduce the cost of hormone by reducing the dose level and also to examine the effect of the repeated flushing on embryo yield. To exploit donor animals fully, repeated flushings were done. But as number of flushing increased, there was reduction in response (total and viable embryo recovery) to hormone (Dutt and Kharche. 2001, Donaldson and Perry,1983).

High pedigreed Holstein Friesian x Sahiwal (HF x S) - F1 generation females were selected based

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on their breeding value and allocated in randomly in two groups. Group A donors were superovulated during January-August, 2001, while Group B donors were superovulated during January-August, 2002. Frozen semen doses of 5 different HF X S bulls were used during the programme. The animals were maintained under identical feeding and housing conditions. Donors were subjected to per-rectal examination for confirmation of estrus. Animals evincing regular cyclicity and exhibiting standing estrus were considered for the programme. At 9-11 day of cycle, the presence and size of CL was confirmed for superovulation. The cows in group A (n= 14) and group B (n=20) received 200 mg and 400 mg of FSH (Folltropin-V, Veterepharm) respectively in equally eight divided doses at 12 h interval. Prostaglandin $F_{2\alpha}$ (Iliren, Hoechest) was given @ 0.98 mg, i/m, single dose at 48 hour after initiation of 1st FSH injection. Three inseminations were done during estrus commencing after 48 hrs. of PG injection. Nonsurgical flushing was done on day 7 from 1st AI. Collection, searching and washing of embryo was done as per standard procedure. Embryos were frozen in Nicool MS-21 biofreezer using 1.4 M Glycerol as freezing media.

In both the categories about 84.0 % animals responded to the superovulatory treatment. The data pertaining to the animals, which had a recovery of e" 1 embryo was considered for analysis. The results pertaining to superovulatory response and embryo yield are presented in Table 1. No significant difference ($P<0.05$) was observed in number of ovulations, anovulatory follicles, total embryo recovery and viable embryo.

The results of repeated flushings within the group are shown in Table 2. There is significant difference ($P<0.05$) in total embryo recovery between 1st and 3rd flush, with 50% dose rate (group A). While there is significant difference in viable embryo recovery between 1st and 3rd flush, with 100% dose rate (group B). Thus, after 2 flushes with 50% dose rate, we could flush the same animal with 100% dose. This may lead to increase in number of total embryo recovery and also viable embryo recovery.

Considering the prevailing cost of one vial of Folltropin V i.e. Rs.4500.00 and other expenses related to flushing to be Rs. 1203.00, the cost of flushing with 100% dose regimen leads to about Rs.5703.00, while the cost of flushing with 50% dose rate accounts to about Rs. 3453.00. The average production cost per embryo came to Rs. 1288.00 with 100% dose rate, while it was Rs.762.00 with 50% dose rate. Based on results, it was concluded that the cost of production per embryo could be reduced with the reduction in FSH dose without affecting the rate of viable embryo recovery.

Table 1: Mean no. of ovulations, anovulatory follicles, total embryo recovery and viable embryo recovery in HF X S donors

Dose Regimen	Ovulations	Anovulatory Follicles	Total Embryo Recovery	Viable Embryo reocvery
Group A (27)	10.90 ± 4.55	3.07 ± 2.59	10.59 ± 6.70	5.37 5.37 ± **6.88**
Group B (35)	12.54 ± 6.71	1.83 ± 2.64	12.80 ± 8.77	5.31 5.31 ± **5.49**

Table 2: Flush wise mean no. of ovulations, anovulatory follicles, total embryo recovery and viable embryo recovery in HF X S donors

No. of Flush	Dose Regimen	Ovulations	Anovulatory follicles	Total Embryo Recovery	Viable Embryo recovery
Ist Flush	50% (15)	12.14 ± 4.19	3.90 ± 2.90	13.71 ± 5.69[a]	5.71 ± 7.55
	100% (20)	12.90 ± 7.21	2.30 ± 3.29	15.30 ± 9.14	6.45 ± 6.00[b]
IInd Flush	50% (8)	10.50 ± 4.84	2.10 ± 1.70	8.75 ± 7.46	6.13 ± 7.85
	100% (12)	11.30 ± 7.10	1.20 ± 1.32	9.90 ± 8.14	4.40 ± 5.25
IIIrd Flush	50% (4)	09.00 ± 4.97	2.80 ± 2.10	4.75 ± 2.87[a]	2.75 ± 2.87
	100% (3)	13.75 ± 4.72	1.00 ± 1.16	8.00 ± 6.48	2.00 ± 2.16[b]

Figures with same superscript in column indicates significant difference.
Figures in parenthesis indicates no. of donors used.

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