

## The Effect Methodology of FSH Injection on The Ovulation Rates of Dairy Cattle

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**ABSTRACT:** The effect methodology of FSH injection on the ovulation rates of dairy cattle was study. Thirteen lactating cows with body weight between 300 to 400 Kg, superovulated by injection a total of 36 mg FSH. Superovulation was started at any day of their cycle between day 9 to 14. The FSH was given twice daily in 12 hours intervals in decreasing doses for 3 and 4 days. Estrumate was injected on day 3 of superovulation (5 th FSH injection) and all donors were artificially inseminated with frozen semen on the onset of oestrus, 12 hours and 24 hours afterwith. The embryo were non surgically collected on day seventh. Majority of embryo was in morulla stages

(80.2 %) and 25.2 % was classified as untransferable embryos. Both the 3x2 and 4x2 regime were equally effective for the superovulation of dairy cattle. The means size of ovary (cm), total numbers of corpus luteum (CL) and embryo (E) were 4.5 , 8.0 and 6.0 and 5.1 , 8.6 and 6.6 for 3x2 and 4x2 regime respectively. Right ovary was more active than left ovary. The mean numbers of CL in the right ovary (4.8) was significantly higher ( $P<0.05$ ) than those in the left ovary (3.6). No significantly difference on the mean size ovary and total number of embryos recovered (4.5 and 2.9 vs 5.3 and 3.4).

Key Words: Injection, Methodology, FSH, Embryos.

### Introduction

Superovulation is an important step in embryo transfer (ET) procedures. Even though much progress has been achieved in standardizing the technique, the unreliable respons of the ovary to superovulatory treatment is still a major limitation for the advancement of the embryos trasfer technology. This variability of ovarian respons has been attributed to the various factors such as age, body size, breed, nutritional status, stage of the oestrus cycle and lactation of donors. Others major factors that affected the variation of ovarian respons are the type and doses of various hormone and methodology of superovulation. There was considerable data have been accumulated in the use of gonadotrophin hormone of PMSG and FSH for both low and high ovulation rates in cattle. It is generally recognized that higher ovulation respons may be obtained following the use of FSH compared to PMSG (Eldsen et al, 1978). The usual dose of FSH for cattle ranges from 30 to 40 mg administrated twice daily for four or five days. Due to biological half life of FSH is short, a two times daily injection is required. Consequently the

prolonged handling animals may cause stress of animals. It is applied to dairy cattle, it decreased milk production when laclating cows used as a donor. William and Donaldson (1990), reported that the response to superovulation was partly controled by stress. In this study we investigated the effects of reducing day of injection of FSH from four days to three days.

### Material and Methods

Experiment was conducted at Research Institute for Animal Production (RIAP). The thirteen lactating cows with body weight between 300 to 400 Kg were used as donors. Cows were individually kept in 2x3 m individual pen, fed with elephant grass and 8 Kg commercial concentrate as the supplementation. Grass and water was available all day and given *ad libitum*. Animals were randomly groups into two treatments (Treatment I: n=6 cows and treatment II : n=7 cows). Donors were superovulated using 36 mg FSH (Demka pharmaceutical Inc,Kawasaki Japan) and were injected intra muscullary (IM). Superovulation began at any days of their cycle between day 9-14.

In treatment I (3x2 regime), FSH was given twice daily with 12 hours interval in decreasing doses methods for 3 days (7-7, 6-6, 5-5 mg FSH), while in treatment II (4x2 regime) the FSH was given for 4 days (6-6, 5-5, 4-4, 3-3 mg FSH). For synchronization 2 ml estrumate was injected two times on the 5 th and 6 th of the administration of FSH. All donors were artificially inseminated with frozen semen on the onset of oestrus, 12 and 24 hours afterwith. Embryos were collected without surgical procedures on day 7 th post insemination (day 0= oestrus) applying a modification of a previously described techniques (Suzuki et al, 1984, Haslers et al, 1983 and Donaldson et al, 1983). Each ovary was examined for the size and the number of corpora lutea (CL) by rectal palpation technique. All data recorded and analyzed by one way analysis of variance.

**Results and Discussion**

All treatment cows came in to oestrus 24 hours after the administration of estrumate. The total embryos collected from thirteen donors were 82 and the stage of these embryos were varied from

unfertilized ova (7.1%), early to late morulla (80.2%) and early blastocyst (12.7%). There was 25.2% embryos were classified as untransferable embryo due to either unfertilized or very bad quality. There was an evidence that the unfertilized ova always occur on the donors that has a high recovery rates. This results is similar to results by Shea et al (1976) who illustrated that fertilization rates tend to decrease as the rates of ovulation increase. Although there was a few numbers of donors showed that the left ovary slightly more active than the right ovary however for overall the mean size ovary, number of CL and embryos were higher in the right ovary than those in left ovary. The means numbers of CL in the right ovary was significantly higher ( $P < 0.05$ ) than in those left ovary. The similar results obtained for the mean size of ovary and the numbers of embryo but the difference was not significant. The effects of methodology of FSH injection on the means number of CL, embryos (E) and size of ovary was shown in Table 1. Although the mean size of ovary, number of CL and embryos for both left and right ovary was slightly higher in 4x2 regime compare to 3x2 regime, but it was not significantly different.

Table 1. The mean size of ovary, number of corpus lutea (CL) and embryos (E) after superovulated with 3x2 and 4x2 regime.

Treatment	Size of ovary (cm)		CL			E		
	L	R	L	R	Total	L	R	Total
3x2	3	5	3	5	8	2	2	4
	2	4	3	4	7	3	2	5
	6	4	4	2	6	4	3	7
	4	5	5	7	12	3	4	7
	5	6	3	5	8	3	7	10
	5	5	3	4	7	1	2	3
Mean	4.2	4.8	3.5	4.5	8.0	2.7	3.3	6.0
4x2	3	7	2	6	8	1	3	4
	4	4	4	4	8	3	4	7
	4	6	2	6	8	2	2	4
	9	6	7	4	11	10	5	15
	7	7	4	4	8	2	2	4
	3	4	3	6	9	2	5	7
	3	5	4	4	8	2	3	5
Mean	4.7	5.5	3.7	4.9	8.6	3.1	3.5	6.6

L : Left ovary

R : Right ovary



The explanation for the non significant difference between these 2 treatments can be accounted as the consequence of the high variation respons between the individual donors for the superovulation treatment. This result is similar to conclusion made by Boland and Roche (1990) that although it is possible to control the estrus cycle precisely using prostaglandin and FSH however, there is wide variation in the yield of transferable embryos between donors. Donaldson (1990) reported that using a total dose of 75 units SUPER-OV to superovulate cattle resulted the non significant difference in the number of transferable embryo between 3x1, 3x2, 4x1 and 4x2 regime. The similar results was also reported in beef cattle that there was no significant difference in embryo production between 3x2 and 4x2 regime (Suzuki, 1992).

The result reported in this study showed the evidence that the mean numbers of CL counted palpation rectal was always higher than the numbers of collected embryos. The possibility explanation for this results was the unaccuracy of counting CL by rectal palpation technique. Estimation of the superovulates respons by rectal palpation of ovary was very difficult since only 60% of the CL on the ovary could be counted (William and Donaldson, 1990). The other explanation was the low quality of follicle produced under hyperstimulation by gonadotrophin hormone. Chupin and Saumande (1990) who reported the absence of response to LH occur at follicular level but not by an insufficient secretion and Donaldson and Ward (1985) have shown the beneficial effects of reduced LH concentrations. The lower total number of embryos recovered compared to total number of CL can also explained that not all ovulation will results the embryo. Testrat (1975) found that increasing ovulation rate will be followed by decreasing in recovery rate and moreover, 60 % of ovulation failed to produce an ovum (William and Donaldson, 1990).

### Conclusion

1. There was a high variation of individual respons of donors to FSH treatment for both 3x2 or 4x2 regime.
2. Both 3x2 or 4x2 regime of FSH was equally effective to superovulate the lactating cows.
3. The right ovary was more active than the left

ovary and the mean numbers of CL was significantly higher on the right ovary than those on the left ovary.

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