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Superovulation and embryo recovery in Ongole cows using different FSH preparations

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ABSTRACT

Fifteen parous Ongole breed cows were repeatedly superovulated for 23 times using two Follicle Stimulating Hormone (FSH) preparations - the Super ov and the Folltropin. 82.6 percent animals responded to superovulation. A total of 46 embryos were collected non-surgically of which 27 were viable. Among the animals responded to superovulation the overall mean ovulation rate, total and viable embryo recovery rates were 9.68±1.79, 2.42±1.29 and 1.42±1.00 respectively. There was a significant (P>0.01) difference between groups in the mean ovulation rate and the mean total and transferable embryos.

Key words: Ongole, superovulation, embryo

Ongole breed of cattle is a famous triple purpose breed known for its hardiness, thriftiness and rustling ability (Narendranath, 1997). It has been an asset to the marginal farmers in the breed tract. However, due to various reasons, its population has gradually dwindled over the years. Embryo transfer technology can be used as an effective tool to protect this breed from the risk of extinction. Present study was therefore conducted to ascertain the comparative efficiency of two FSH preparations on superovulatory response and embryo recovery in Ongole cows.

MATERIAL AND METHODS

Fifteen parous, healthy, normally cycling Ongole cows aged 6 - 10 years were used for the present study. They were maintained under uniform housing and management conditions. Calves were allowed to suckle the dams and hand milking was carried out twice daily.

The cows were randomly divided into 2 groups and superovulation was started during mid luteal phase (day 9 - 12) of cycle. Animals in group I were administered 75 NIH-FSH-S1 units (Super - ov ; Ausa International Inc., Tyler, Texas, USA) in three equally divided doses at 24 hours interval intramuscularly. Group II animals were given 400 mg of NIH - FSH - P1 (Folltropin, Vetrepharm, London, Ontario, Canada) intramuscularly for 4 days at 12 hours interval in divided and declining doses (80, 80, 60, 60, 40, 40, 20 and 20 mg). Luteolysis was induced by intramuscular administration of 50mg dinoprost tromethamine (Lutalyse, Upjohn, and USA) in two equally divided doses at 48 hours and 60 hours of superovulation treatment. Animals were inseminated thrice at 12 hourly interval during estrus period. The number of corpora lutea (CL) were counted per rectum just before non-surgical embryo collection on day 7 of super estrus using 18 gauge Rusch catheter (minitub, Germany) and Dulbecco's phosphate buffer saline. (D-PBS; Sigma, USA) as flushing medium (Misra *et al.*, 1990). The embryos were classified as transferable and non transferable on the basis of their morphology (Mapletoft, 1980). The data were expressed as mean ± standard error (S.E) and percentage. Means were compared by student t test while data expressed in percentage were compared by chi-square test (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

In all the 23 superovulation treatments, a total of 184 ovulations were observed (average 9.68±1.79) and 46 total (average 2.42±1.29) and 27 transferable embryos (average 1.42±10) were recovered from 19/23 (82.6%) animals that responded (having more than 2 CL) to superovulation. The total embryo recovery was 25% of

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Table 1. Superovulatory response and embryo recovery in Ongole cows with different FSH preparations

Attributes		Treatments		Total
		Super - OV	Folltropin	
1	No. of animals treated	7	8	15
2	No. of superovulation treatments	15	8	23
3	No. of responded treatments (>2CL, %)	11(73.3)	8 (100)	19 (82.6)
4	Total ovulation (CL)	84	100	184
5	Mean number of ovulations*	7.64±1.07	12.50±4.20	9.68±1.79
6	Total no. of embryos recovered (%)*	13 (15.48)	33 (33)	46 (25)
	a. Number of viable embryos (%)	4 (30.8)	23 (69.7)	27 (58.7)
	b. Number of degenerated embryos (%)	9 (69.2)	10 (30.3)	19 (41.3)
7	Mean no. of embryos recovered (%)*	1.18±0.24	4.13±3.26	2.42±1.29
	a. Mean viable embryos	0.36±0.16	2.88±2.52	1.42±1.00
	b. Mean degenerated embryos	0.82±0.24	1.25±0.90	1.00±0.37

*Animals not responded were excluded

ovulations and transferable embryos were 58.7% of total embryos recovered (table).

The ovulatory response varied considerably among donors (range 3-29 CL) and may be attrible to factors such as ovarian status of donor at the time of gonadotrophin treatment (Monniaux *et al.*, 1983; Armstrong, 1993), age and body weight of animals (Haupat,1979), treatment regimen i.e drug and dose used (Lopes da costa *et al.*, 2001) and endogenous hormonal milieu (Sreenan *et al.*, 1980). The incidence of superovulatory response was 73.3 and 100 per cent in Super-ov and Folltropin treated animals respectively and the difference was not significant. Lopes da costa *et al.* (2001) reported only 30% superovulatory response with super-ov in native Mertelango cattle. The mean number of ovulations was significantly (P<0.01) greater in Folltropin treated group than in Super-ov treated animals.

The mean total embryo recovery was significantly (P<0.01) higher in Folltropin treated cows than in Super-ov treated animals. Of the 46 embryos recovered, 13 (1.18±0.24) and 33 (4.13±3.24) respectively were from Super-ov and Folltropin treated donors. The better embryo recovery with Folltropin may be due to individual variation in embryo recovery rather than drug effect, as one animal in Folltropin group yielded 25 embryos. There was a non significant difference in per cent embryo recovery between two groups (15.48 vs 33).

There was a significant (P<0.01) difference in the mean viable embryo recovery (0.36±0.16 vs 2.88±2.52) between groups and the per cent degenerated embryos was found to be higher in Super-ov treated animals than in Folltropin treated cows (69.2 vs 30.3). Amongst various factors that might affect embryo quality include aberrant preovulatory endocrine ambience (Callesen *et al.*, 1988) which can lead to anomalous follicle morphology and function (Fortune *et al.*, 1985), oocyte maturation (Hyttel *et al.*, 1991), sperm transport and fertilisation. The mean viable embryo recovery in the present study was found to be similar to the reports of Kasiraj *et al.* (1999) and Sarvaiya *et al.* (2003) but lower than that of Mutha Rao *et al.* (2002) in Ongole cows.

In conclusion the results suggests that the mean ovulation rate, total and viable embryo recovery rates were significantly greater with Folltropin treatment. How ever the factors governing low viable embryo recovery rate require further studies.

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