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ESTROGEN AND PROGESTERONE LEVELS FOLLOWING OVSYNCH PROTOCOL IN CROSSBRED COWS

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ABSTRACT
Numbers of estrus synchronization programmes are available in cattle based on the use of various hormones like progesterone, prostaglandin and their various combinations with other hormones like estrogen and gonadotrophin Releasing hormone (GnRH). Selection of appropriate estrus synchronization protocol should be made on the basis of management capabilities and expectations of the farmer. A basic understanding of the bovine estrus cycle can increase the effectiveness of reproductive management. Almost half of dairy cows may have not been detected for behavioral estrus. This inefficiency results in larger than optimal calving intervals, loss of milk yield and can limit reproductive performance in commercial dairy herds. A novel synchronization protocol named Ovsynch was developed (Pursley *et al*., 1995) in cows, which requires a three injection schedule (GnRH - $PGF_2\alpha$ - GnRH) for synchronization of ovulation. A total of 6 Crossbred cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Blood samples were collected on day 0, 7, 10 & 20. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immunosorbant-Assay (ELISA) kits. The mean plasma progesterone concentration before treatment (0.73 ±0.12 ng/ml) was higher than day of induced estrus (0.16 ±0.06ng/ml) and the mean plasma Estradiol- 17-β concentration 30.72 ±0.77 (pg/ml) on day of induced estrus (Day 10) was significantly higher ($P<0.01$). In Ovsynch protocol, out of six animals, three were found to be pregnant with conception rate of 50%.

KEYWORDS: synchronization, estrus, $PGF_2\alpha$, GnRH, estrogen, progesterone, crossbred.

INTRODUCTION

Estrous (heat) synchronization in cattle involves manipulating the female's estrous cycle so they can be bred at about the same time. The normal 21-day estrous cycle in cattle can be altered by following an effective estrous synchronization protocol. There are several advantages to consider when following an estrous synchronization protocol, including: 1) shortening the calving interval, which allows females (especially heifers) to conceive earlier in the breeding season; 2) more effectively using AI and embryo transfer to reduce time and labor in detecting estrus (heat); and 3) producing a more uniform calf crop with similar ages. The modern day lactating dairy cow is considered to be sub-fertile in which the physiological stress of high production and current management systems develops a negative impact on both estrus detection and fertility. Pharmacological control of the estrus cycle involves synchronization of follicular development that is coupled with the timely induction of corpus luteum (CL) regression and synchronization of ovulation to improve pregnancy rates. Pregnancy rate is the product of the estrus detection and conception rate. Increasing conception rates is difficult; therefore improving rates of estrus detection is likely the easiest way to improve reproductive efficiency. A novel synchronization protocol named Ovsynch was developed (Pursley *et al*., 1995) in cows, which requires a three injection schedule (GnRH- $PGF_2\alpha$- GnRH) for synchronization of ovulation. The technique was successfully carried out in cycling buffaloes by Paul and Prakash (2005) for synchronization of ovulation and fixed timed A.I.

MATERIALS & METHODS

The proposed investigation was conducted at Livestock Farm, Adhartal, Jabalpur (M.P.) and Department of Veterinary Physiology & Biochemistry, College of Veterinary Science & A.H., MPPCVV, Jabalpur (M.P.). A total of 6 Crossbred cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. The Ovsynch protocol consists of two injections of a GnRH analogue separated by a single administration of $PGF_2\alpha$ in which GnRH (10 µg, I/M) was given on day 0, $PGF_2\alpha$ (25 mg I/M) was given on day 7, GnRH (10 µg, I/M) was given on day 9 and fixed timed A.I. was done on day 10. Blood samples (5 ml with 10 % aqueous solution of Ethylene Diamine Tetra Acetic acid (EDTA) as anti-coaugulant) were collected from each animal aseptically by jugular vein puncture by using sterilized needle on day 0, 7, 10 & 20. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immuno-sorbant-Assay (ELISA) kits.

RESULTS AND DISCUSSION

Plasma Progesterone

The mean plasma progesterone concentration before treatment (0.73 ±0.12 ng/ml) was higher than mean plasma progesterone concentration (0.16 ±0.06 ng/ml) on day of induced estrus. The result indicated that mean plasma progesterone concentration was highly significant ($P<0.01$) within group. During Ovsynch protocol, the

circulatory level of mean plasma progesterone was declined to less than 0.2ng/ml within 72 hrs after $PGF_2\alpha$ injection. A similar decline in plasma progesterone concentration to basal levels (<0.1ng/ml) within 24hrs after $PGF_2\alpha$ administration in Ovsynch treated cows (Peters *et al*., 1999) support the present results. The study (Berber *et al*., 2001) showed a similar decline in plasma progesterone from 3.17 ±9.0 ng/ml on 7th day of Ovsynch treatment to 0.31 ±0.44ng/ml on 9th day after $PGF_2\alpha$ injection in half-bred (Murrah×Mediterranean).

Plasma Estrogen

On the day of induced estrus, the mean plasma Estradiol-17-β concentration was 30.72 ±0.77 pg/ml which is significantly higher than the values obtained on 7th day of treatment protocol (12.64 ±0.27 pg/ml) and before treatment (9.07 ±0.62 pg/ml). There was significant difference found (P<0.05) within group. The mean estrogen concentration in Ovsynch protocol was 12.64 ±0.27 pg/ml on 7th day of treatment which increased to 30.72 ±0.77 pg/ml on day of induced estrus which is close to the findings of Kumar *et al*. (1991) who reported that the concentration of estrogen increased following luteolysis and reached its peak value of 30-35 pg/ml either a day before or on day of estrus. Caesar (2009) reported estradiol-17β concentration (pg/ml) at induced estrus was 40.47 ±2.66 to 44.83 ±1.49 by using CIDR implant which is in close agreement with the findings of Dugwekar *et al*. (2008), who also recorded 40.20 ±19.68 pg/ml estradiol-17 β at estrus in six Jafarabadi buffaloes.

TABLE 1: Mean plasma concentration of estrogen and progesterone in Ovsynch protocol

	Mean ±SE			
Parameters	Day 0	Day 7	Day 10	Day 20
Progesterone (ng/dl)	0.73^{ab}±0.12	0.83^{ab}±0.20	0.16^{b}±0.06	1.44^{a}±0.47
Estrogen (pg/ml)	9.07^{c}±0.62	12.64^{b}±0.27	30.72^{a}±0.77	6.38^{d}±1.12

Mean values with different superscripts in a row vary significantly (P<0.05)

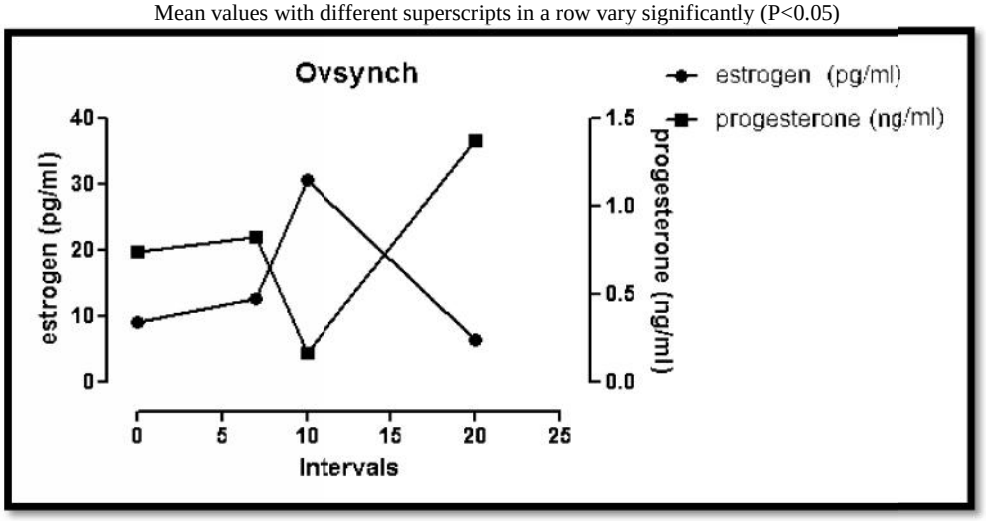

FIGURE 1- Mean concentration of estrogen and progesterone during Ovsynch protocol

CONCLUSION

Present study reveals that Ovsynch protocol was effective for resuming animal fertility and ovarian activity and gave 50% conception rate in Crossbred cows. Regarding the estrogen and progesterone levels following the $PGF_2\alpha$ injection there is fall found in the progesterone concentration following $PGF_2\alpha$ injection. Simultaneously, the estrogen concentration increased to obtain optimum estrogen and progesterone ratio required for exhibiting symptoms of estrus. A major advantage of some protocols is the possibility of timed AI, which makes work with the animals easier and less time-consuming. An additional effect is minimizing the problem of unobserved heat. Ovsynch, as one of the most popular hormonal protocols, can be used both for routine cycle synchronisation and for treatment of cystic ovarian disease, silent heat, or heat stress.

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