ESTROGEN AND PROGESTERONE LEVELS FOLLOWING DOUBLE INJECTIONS OF PGF\(_{2}\alpha\) IN ESTRUS SYNCHRONIZATION OF SAHIWAL COWS

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ABSTRACT
Synchronization of estrus is the fact of making a number of cows come into heat at the same time. This allows better planning of breeding activities and wider use of artificial insemination. Various estrus synchronization protocols have been tried among many other reproductive technologies for improving the fertility of buffaloes. 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. The use of two PGF\(_{2}\alpha\) injections at interval of 11 to 14 days is the most popular technique of estrus synchronization in cattle and buffaloes. PGF\(_{2}\alpha\) being a luteolytic agent regulates the life span of the corpus luteum on the ovary, and is therefore, used for estrus synchronization. A total of 6 Sahiwal cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Two injections of PGF\(_{2}\alpha\) (25 mg I/M) were given 11 days apart. Blood samples were collected on day 0, 11, 12, 13 & 14. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immuno-sorbant-Assay (ELISA) kits. The mean plasma progesterone concentration before treatment was 0.69 ±0.09 (ng/ml). On day 11 the mean plasma progesterone concentration (ng/ml) was 0.67 ±0.09 which falls to 0.14 ±0.03, 0.13 ±0.03 and 0.10 ±0.02 on day 12, 13 and 14 respectively following PGF\(_{2}\alpha\) injection. There was gradual increase in mean plasma estrogen concentration from day 0 to day 14. The mean plasma estrogen concentration before treatment was 8.69 ±0.66 (pg/ml) which increased to a level of 27.59 ±1.79 pg/ml (P<0.01). Present investigation reveals that Double PGF\(_{2}\alpha\) protocol is found out to be 100% efficient in estrus synchronization for Sahiwal cows.

KEYWORDS: synchronization, estrus, PGF\(_{2}\alpha\), estrogen, progesterone, Sahiwal.

INTRODUCTION
Synchronization of estrus is the fact of making a number of cows come into heat at the same time. This allows better planning of breeding activities and wider use of artificial insemination. Various estrus synchronization protocols have been tried among many other reproductive technologies for improving the fertility of buffaloes. 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.

The use of two PGF\(_{2}\alpha\) injections at interval of 11 to 14 days is the most popular technique of estrus synchronization in cattle and buffaloes (Odde, 1990; Singh et al., 2000). PGF\(_{2}\alpha\) being a luteolytic agent regulates the life span of the corpus luteum on the ovary, and is therefore, used for estrus synchronization. However, estrus cannot be synchronized precisely with single injection of PGF\(_{2}\alpha\) because it does not synchronize growth of ovarian follicles. Thus, estrus detection is needed over a 7 day period after PGF\(_{2}\alpha\) administration.

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., NDVSU, Jabalpur (M.P.). A total of 6 Sahiwal cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Two injections of PGF\(_{2}\alpha\) (25 mg I/M) were given 11 days apart. Blood samples (5 ml with 10 % aqueous solution of ethylene diamine tetra acetic acid; EDTA as anticoagulant) were collected from each animal aseptically by jugular vein puncture by using sterilized needle on day 0, 11, 12, 13 & 14. Hormonal assay was done in plasma samples by using Enzyme-Linked-Immuno-sorbant-Assay (ELISA) kits.

RESULTS & DISCUSSION
Plasma Progesterone
The mean plasma progesterone concentration 0.69 ±0.09 (ng/ml) before treatment was higher than mean plasma progesterone concentration 0.10 ±0.02 (ng/ml) on the day of induced estrus (day 14). On day 11 the mean plasma progesterone concentration (ng/ml) was 0.67 ±0.09 which falls to 0.14 ±0.03, 0.13 ±0.03 and 0.10 ±0.02 on day 12, 13 and 14 respectively following luteolysis caused by PGF\(_{2}\alpha\) injection on day 11. There was highly significant difference (p<0.01) found within group. The mean plasma progesterone concentration declined from 0.67 ±0.09 to 0.14 ±0.03 ng/ml (p<0.01) 24 hrs after second PGF\(_{2}\alpha\) injection on day 11 and further decreased to 0.10 ±0.02 ng/ml on day of induced estrus. The plasma progesterone concentration decreased drastically to the basal levels of <0.15 mg/ml within 3 hrs after PGF\(_{2}\alpha\) injection at luteal
phase in swamp buffaloes (Kamonpatana et al., 1979; Kanai and Shimizu, 1987) and in Murrah buffaloes (Bachlaus et al., 1980).

**Plasma Estrogen**
The mean plasma estrogen concentration 8.69 ±0.66 (pg/ml) before treatment was lower than mean plasma estrogen concentration 27.59 ±1.76 (pg/ml) on the day of induced estrus (day 14). There was gradual increase in mean plasma estrogen concentration from day 0 to day 14. A highly significant difference (p<0.01) found within group. The mean estrogen concentration was 8.69±0.66 pg/ml which increased to a level of 27.59 ±1.79 pg/ml (p<0.01) which is close to the finding of Mondal et al. (2010) he reported the plasma concentration of estrogen 11.04 ±0.13 pg/ml during mid-luteal phase and increased to maximum concentration of 22.48 ±0.32 pg/ml during peri-estrus phase in buffaloes. By using CIDR implant Caesar (2009) reported the concentration (pg/ml) of estradiol-17β at induced estrus was 40.47 ±2.66 to 44.83 ±1.49 which is in close agreement with reports of Dugwekar et al. (2008), who also recorded 40.20 ±19.68 pg/ml estradiol-17 β at estrus.

**R.E.F.**

**REFERENCES**


**TABLE 8:** Mean Plasma Concentration of Estrogen and Progesterone in Double PGF₂α Protocol

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Day 0</th>
<th>Day 11</th>
<th>Day 12</th>
<th>Day 13</th>
<th>Day 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estrogen (pg/ml)</td>
<td>8.69± 0.66</td>
<td>9.18± 0.56</td>
<td>13.41± 0.59</td>
<td>26± 2.04</td>
<td>27.59± 1.76</td>
</tr>
<tr>
<td>Progesterone (ng/ml)</td>
<td>0.69± 0.09</td>
<td>0.67± 0.09</td>
<td>0.14± 0.03</td>
<td>0.13± 0.03</td>
<td>0.10± 0.02</td>
</tr>
</tbody>
</table>

Mean values with different superscript in rows differ significantly (p<0.05)