International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(3): 1274-1275

Received: 22-03-2020
Accepted: 24-04-2020

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Changes in hematological parameters in sahiwal cows reaching to estrus following PGF$_2\alpha$ (double) injections

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DOI: https://doi.org/10.22271/chemi.2020.v8.i3q.9376

Abstract
PGF$_2\alpha$ being a luteolytic agent regulates the lifespan of the corpus luteum on the ovary and is therefore, used for estrus synchronization. The present study was conducted on 6 non-inseminated, non-pregnant, anestrus (pre or post-service) or repeat breeder Sahiwal cows. Blood samples were collected after double injections of PGF$_2\alpha$ for haematological analysis on day 0, 11, 12, 13 & 14. TLC (thousands/ µl), TEC (millions /µl), Hb (%), PCV (%), MCV (fl), MCH (pg) and MCHC (g/dl) were evaluated by using an automatic blood analyser. The study indicated no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC during estrus synchronization with double PGF$_2\alpha$ protocol. The alteration in blood picture of cow on day of induced estrus (day 14) was non significant decrease in TEC, Hb and PCV.

Keywords: PGF$_2\alpha$, estrus, haematological parameters, sahiwal cows

Introduction
PGF$_2\alpha$ being a luteolytic agent regulates the lifespan of the corpus luteum on the ovary and is therefore, used for estrus synchronization. However, estrus cannot be synchronized precisely with 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. The use of two PGF2α injection at interval of 11 to 14 days is the most popular technique of estrous synchronization in cattle and buffaloes (Singh *et al*., 2000) [5]. Since blood profile changes during various reproductive states, it is imperative to study haematological constituents during these states. Hence, the haematological profile can be used to monitor the health and reproductive status of herd.

Materials and method
The proposed work 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.). The study was conducted on 6 non-inseminated, non-pregnant, anestrus (pre- or post-service) or repeat breeder Sahiwal cows. Clearance of this experimental study was taken from the Institutional Animal Ethics Committee. Blood samples were collected from each animal aseptically by jugular veinpuncture by using sterilized needle for haematological analysis on day 0, 11, 12, 13 & 14. The haematological parameters were TLC (thousands/ µl), TEC (millions /µl), Hb (%), PCV (%), MCV(fl), MCH (pg) and MCHC (g/dl) evaluated by using an automatic blood analyser. Statistical analysis of haematological parameters at different days was done using CRD as per the method describe by Snedecor and Cocharan (1994) [6].

Result and discussion

Parameters	Day 0	day 11	day 12	Day 13	day 14
	Mean±SE	Mean±SE	Mean±SE	Mean±SE	Mean±SE
TLC(10^3/µl)	27.56^{a}±3.14	27.25^{ab}±3.14	24.83^{abc}±2.41	24.38^{bc}±2.11	24.03^{c}±1.98
TEC(10^6/µl)	5.44±0.26	5.45±0.32	5.44±0.16	5.11±0.12	5.09±0.25
Hb (%)	11.15±0.58	10.57±0.55	10.98±0.33	10.41±0.32	10.38±0.68
PCV (%)	36.15±1.87	35.51±1.95	35.65±1.72	33.65±0.78	33.1±2.75
MCV (fl)	66.51±1.55	66.18±1.64	65.5±1.78	66.03±1.67	64.6±2.72
MCH (pg)	20.48±0.32	20.62±0.47	20.13±0.30	20.31±0.52	20.28±0.68
MCHC(g/dl)	30.83±0.79	30.72±0.78	30.95±0.93	30.96±1.03	31.65±1.08

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

The present study indicate no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC at the time of induced estrus (day 14) in Sahiwal cows during double $PGF_2\alpha$ protocol. Akhoon *et al*. (2012) [1] also reported haematological parameters (TEC, PCV, MCV, MCH and MCHC) studied showed no significant difference between the two groups (oestrus and non oestrus) in crossbred Jersey cows. The alteration in blood picture of Sahiwal cows in estrus was decrease in TEC, Hb and PCV. These changes could be attributed to the direct action of the increased production of estrogen at this stage or indirectly from the anterior pituitary activity (Wolf, 1949) [8]. Shakkarpude *et. al* (2017) [4] reported significant decrease in the TEC, Hb and PCV at the time of induced estrus from the day before start of treatment with double PGF2α protocols in crossbred cows.

Another explanation for such haematological deviation might be the increased adrenocortical activity. It is generally agreed that androgen stimulates the erythropoiesis and estrogen produce anemia by inhibiting erythropoiesis. Mirand and Gordan (1966) [2] described how estrogen inhibit erythropoiesis by suppressing the production of an external precursor of erythropoiesis stimulating factor which requires activation by the kidney mechanism for elaboration of the functional circulating erythropoiesis stimulating factor. Soliman and Selim (1966) [7] has studied the blood picture of various reproductive phases in buffaloes and concluded that erythrocyte number and haematological content dropped at estrus. In present study TLC was decreased on day of induced estrus as compare to 0 day, which is in agreement with investigation of Pariza *et. al* (2013) [3] which reported that the TLC in anestrous group of cows was significantly higher than that in the normal cycling control group of cows.

Conclusion

The study concluded no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC during estrus synchronization with double $PGF_2\alpha$ protocol in Sahiwal cows. Hematological parameters alongwith biochemical and hormonal parameters may be an important tool for the assesment of reproductive behavior in Sahiwal cows.

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