IMPACT OF BUSERELIN ACETATE ADMINISTRATION AT ESTRUS OR DURING LUTEAL PHASE ON PLASMA PROGESTERONE IN DAIRY CATTLE REARED UNDER TEMPERATE CLIMATE

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ABSTRACT

Crossbred dairy cattle were administered (i.m.) 0.021 mg buserelin acetate, a GnRH analogue, on day of estrus (d0, n=8), or day 5 (n=8) or day 12 (n=10) post estrus, and a non-treatment group was kept as control (n=10). Plasma progesterone was estimated on day 0, 7 and 14 post estrus. Neither of the treatment had an impact on plasma progesterone as the values were similar on day 7 and 14 post estrus between treatment as well as control groups.

Key words: Buserelin acetate, Progesterone, GnRH

Lower plasma progesterone during first three weeks of pregnancy was recorded in cattle failing to conceive subsequently (Mann *et al*., 1999). An increase in plasma progesterone may have a positive impact on embryonic development and subsequent maternal recognition of pregnancy (Garrett *et al*., 1988). In fact, a close relationship exists between milk progesterone on day 5 post-insemination and pregnancy outcome (Mann and Lamming, 2001). To develop strategies aimed at increasing conception rate in the field, the present study was planned to assess the impact of buserelin acetate, a GnRH analogue, administration on the day of estrus or luteal phase on subsequent plasma progesterone in dairy cattle.

The work was conducted on 34 crossbred dairy cattle maintained in temperate climate at University Livestock farm, Palampur (32.6°N, 76.3°E, altitude 1290.8m). Animals were treated with 0.021 mg (5 ml) Buserelin acetate either on day of estrus (d0, n=8) or day 5 (n=8) or day 12 (n=10) post estrus. Ten cattle without any hormone treatment were kept as controls. Jugular vein blood samples were collected on days 0, 7 and 14 post estrus in all groups. The plasma was separated by centrifuging blood samples @ 3000 r.p.m for 10 min and stored at -20°C. Plasma progesterone was estimated using an established liquid phase radioimmunoassay procedure (Ghuman *et al.,* 2009). The data obtained were analyzed using SAS statistical package version 9.2.

A consistent pattern of increase in plasma progesterone from day 0 to day 14 was observed in all treatment groups as well as controls, however, the recorded concentrations were similar between groups on day 7 as well as day 14 post estrus ($p>0.05$, Table). This suggested that GnRH analogue treatment on day 0, 5 or 12 post estrus had no impact on subsequent plasma progesterone in the present study. Conflicting results regarding the impact of GnRH treatment at estrus or day 5 or 12 post estrus on subsequent plasma progesterone were also reported earlier (Taponen *et al*., 2000; Shahneh *et al*., 2008; Franco *et al*., 2006 and Perry and Perry, 2009). Considering the positive impact of GnRH analogue treatment during estrous cycle on subsequent conception rate as reported in earlier studies (Jaswal and Singh, 2013), it can be suggested that factors other than GnRH treatment induced improvement in luteal activity may also be playing a role in increasing conception rate. These factors may include timely occurrence of ovulation and subsequent fertilization following GnRH analogue treatment on day of estrus (Yaniz *et al*., 2004), ovulation of dominant

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Table: Plasma progesterone (Mean±SE) **in crossbred dairy cattle administered Buserelin acetate at estrus or during luteal phase**

Group	**Plasma Progesterone**, ng/ml		
	Day 0	**Day 7**	**Day 14**
Day of estrus (d0), n=8	0.42±0.06 (0.24-0.82)	2.01±0.20 (0.9-2.7)	3.38±0.31 (2.3-4.7)
Day 5 post estrus, n=8	0.52±0.12 (0.16-0.68)	1.87±0.15 (1.3-2.6)	2.76±0.28 (1.7-4.0)
Day 12 post estrus, n=10	0.41±0.08 (0.1-1.0)	2.06±0.16 (1.3-2.7)	3.01±0.31 (1.8-5.2)
Control, n=8	0.47±0.12 (0.1-1.1)	1.91±0.22 (0.8-2.6)	2.61±0.32 (1.7-4.4)

(Figures within parenthesis indicate range)

follicle by GnRH treatment on day 12 post estrus leading to removal of estradiol source and hence delay in luteolytic response (Thatcher *et al*., 2003).

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