

## Effect of resynchronization with intravaginal progesterone device from 14 to 21 days post-AI on estrus synchrony and pregnancy in lactating dairy cows

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### Abstract

Resynchronization in dairy cows provides tighter synchrony of follicular dynamics and estrus, and facilitates submission for subsequent artificial insemination (AI) in a timely manner. Intravaginal progesterone devices (IPD) are considered safe for the use in lactating dairy cows and have been granted zero milk withdrawal and zero milk discard time. (<http://www.fda.gov/downloads/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/FOIADrugSummaries/UCM235348.pdf>). The objective of this study was to evaluate whether resynchronization of cows with IPD from Day 14 to 21 post-AI provides tighter synchrony of estrus and improved pregnancy/AI for subsequent AI. Lactating dairy cows (N=1132) were randomly assigned to two groups. Group 1 (IPD group, N=532) received an IPD (Eazi-Breed™ CIDR®, Pfizer Animal Health, New York NY) for seven days starting from Day 14 to 21 post-AI. Group 2 (CON group, N=600) received no treatment. Cows in the IPD group were observed for estrus three times daily from day 20 to 42 after AI and those in the CON group from day 18 to 42 after AI. Cows observed in estrus (IPD: N=352 and CON: N=403) were inseminated by the AM-PM rule. Pregnancy examination was performed approximately 40 days after insemination by per-rectal palpation. Estrus frequency distribution revealed no difference between the IPD and CON groups (P>0.1). Accounting for season (P<0.05), there was no difference in pregnancy/AI between IPD and CON groups, 20.2 % (71/352) and 23.3% (94/403), respectively (P>0.05). In conclusion, IPD treatment for seven days from Day 14 to 21 post-AI did not improve estrus synchrony and pregnancy compared to controls.

**Keywords:** Dairy cows, progesterone, resynchronization, estrus, pregnancy

### Introduction

In lactating dairy cows, different strategies are used to resynchronize return to estrus in order to increase the number of cows re-inseminated in a timely manner. Initiation of Ovsynch/Heatsynch/CO-Synch at or seven days prior to pregnancy diagnosis,<sup>1,2</sup> presynch with gonadotropin releasing hormone (GnRH) seven days prior to pregnancy diagnosis and initiation of Ovsynch/CO-Synch in non-pregnant cows,<sup>3-5</sup> insertion of an IPD, or a combination of a GnRH injection at IPD insertion and/or after IPD removal at or seven days prior to pregnancy diagnosis<sup>1</sup> resynchronizes the return to estrus following a prior insemination. These strategies require compliance since several injections need to be administered over a period of ten days. Also these strategies are advocated for timed AI protocols and hence useful on farms with heat detection concerns. In these protocols cows will be submitted for re-insemination from 35 to 45 days after the previous AI. Alternatively a strategy that involves insertion of IPD from day 14 to 21 would minimize the interval between inseminations. Upon removal of the IPD on day 21, non-pregnant cows will return to estrus. Using this strategy cows that show estrus would be re-inseminated within 28 days after AI. The objective of this study was to evaluate if resynchronization of cows with an IPD from Day 14 to 21 post-AI would provide tighter synchrony and improved pregnancy/AI for subsequent AI.

### Materials and methods

Lactating dairy cows (N=755) from two herds located in North Carolina were enrolled in this study. Cows were housed in free-stall barns and bedded on rubber mats or sand. Cows received a total mixed ration balanced to meet or exceed the requirements for lactating dairy cows. Cows were randomly assigned to one of two groups. Cows in group 1 (IPD group, N=532) received an IPD for seven days

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starting from Day 14 to 21 post-AI. Cows in group 2 (CON group, N=600) received no treatment. Cows were observed for estrus three times daily from day 21 to 42 after AI. Cows observed in estrus (IPD: N=352 and CON: N=403) were inseminated by the AM-PM rule. Pregnancy examination was performed 40 days after AI by per-rectal palpation. Cows were synchronized with Presynch(14-14 d)-Ovsynch for the previous insemination.

### Statistical analysis

Logistic model (PROC LOGISTIC procedure of SAS version 9.12, SAS Institute Inc., Cary, NC) was used to determine the effect of the IPD on pregnancy/AI and submission rates. Variables included in the model were treatment (IPD vs. control), season, location, technician and appropriate interactions. The model was created by manual backward stepwise elimination procedure ( $P > 0.10$  for exclusion). A  $P$  value of  $\leq 0.05$  was considered as significant.

### Results

There was no difference in the submission rate between IPD and CON groups, 66.2% (352/532) and 67.2% (403/600), respectively ( $P > 0.1$ ). Estrus frequency distribution revealed no difference between the IPD and CON groups ( $P > 0.05$ ; Figure), except on d 21 more cows were detected in estrus in the CON group and on d 23 more cows were detected in estrus in the IPD group. Accounting for season ( $P < 0.05$ ), there was no difference in pregnancy/AI between the IPD and CON groups, 20.2% (71/352) and 23.3% (94/403), respectively ( $P > 0.05$ ; Table).

### Discussion

In this study, 66.2% (352/532) of cows in the IPD group and 67.2% (403/600) in the control group were inseminated. Bartolome et al treated cows with an IPD from 14 to 23 days after AI. In that study 27.9% cows in the IPD group and 49.2% in the control group were inseminated at observed estrus.<sup>1</sup> The authors have claimed that administration of the IPD between Days 14 and 23 after first service reduced the frequency of cows re-inseminated at a detected estrus. They observed for estrus from 23 to 30 days after AI compared to 21 to 42 days in the current study. Interestingly, in contrast, estrus distribution from 21 to 28 days was higher for the IPD group compared to the CON group, 65.2% (230/353) and 56.6% (228/403), respectively ( $P < 0.05$ ). It should be noted that about 8.7% (35/403) of cows in the CON group in the present study showed estrus from d 18 to 20 post-AI, a plausible reason for the observed difference in estrus distribution during 21 to 28 days after AI. Galvao et al inserted an IPD from 14 to 21 d after AI. The cows were observed for estrus and inseminated using the AM-PM rule.<sup>7</sup> Cows in the control group were inseminated at detected estrus from d 14 to 31. The estrus distribution during 21 to 24 d after AI was 25.1% (54/215) for controls compared to 39.1% (86/220) for the IPD group ( $P < 0.05$ ). However, the estrus distribution during 14 to 24 days after AI was 42.8% (92/215) for the control group compared to 40.9% (90/220) for the IPD group ( $P > 0.1$ ).

In the present study, there was no difference in pregnancy/AI between IPD and CON groups, 20.2% (71/352) and 23.3% (94/403), respectively ( $P > 0.05$ ). Even though cows observed in estrus were different during the seven day period from 21 to 28 days after AI there was no difference in pregnancy/AI ( $P > 0.1$ ). Similarly, in a previous study pregnancy/AI at 30 d gestation was not different for both groups, 28.6% (61/213) for the control group and 24.7% (48/194) for the IPD group.<sup>1</sup>

In conclusion, IPD treatment for seven days from Day 14 to 21 post-AI did not improve estrus synchrony and pregnancy compared to control groups.

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Figure

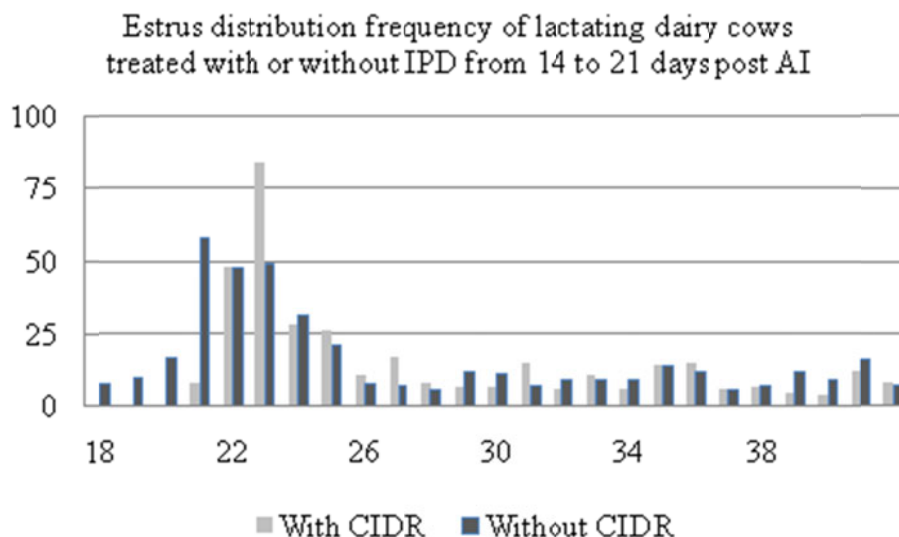


Table. Predictors of pregnancy/AI, odds ratio, 95% confidence interval and level of significance for risk of pregnancy at re-insemination for dairy cows in the IPD<sup>†</sup> or control groups

Predictor	Coefficient	SE Coefficient	P	Odds Ratio	95% CI	
					Lower	Upper
Constant	-1.68443	0.273545	0.0001	-	-	-
Treatment	-0.17847	0.177539	0.315	0.84	0.59	1.18
Season	0.195767	0.094667	0.039	1.22	1.01	1.46

<sup>†</sup>IPD—Intra-vaginal progesterone device (Eazi-Breed<sup>™</sup> CIDR<sup>®</sup>, Pfizer Animal Health)

SE—Standard error

CI—Confidence interval

