

Substitution of GnRH by Estradiol Benzoate (EB) in an Estrus Synchronization Protocol in Dairy Cows: Ovarian and Endocrine Responses

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To compare the traditional Ovsynch protocol (GnRH-PGF_{2α}-GnRH) with a protocol consisting in GnRH-PGF_{2α}-EB, 16 cyclic Holstein cows in late lactation were presynchronized with two injections of PG (14 days apart). At day 9 after the induced estrus, they were assigned randomly to two groups (n=8) and treated with: a GnRH analog (D0) and a PGF_{2α} analog (D7). At D8 the EB group received: 1 mg of EB and at D9 the Ovsynch group received 250 µg of the same GnRH analog. Ultrasonography of the ovaries (US) was done daily from D0 to D7. After the injection of EB (D8) or GnRH (D9), and until D11, US frequency was increased to 5x day to detect ovulation. Blood samples were collected daily (D0-D8) to determine progesterone (P4). A frequent bleeding started 1 h before EB and GnRH injection until 20 h after.

Results:

At D0, mean sizes of the dominant follicle (DF) and of the CL were 14.9±0.7 and 26.9±1.0 mm, respectively. All cows ovulated after the first GnRH injection, and 15/16 formed an accessory CL. At D9, the size of the new DF was 15.3±1.1 mm with a growth rate of 1.9±0.1 mm/day. P4 levels increased from D0 to D7 ((7.6±0.7 vs. 12.4±0.9 ng/ml) (P<0.001). LH surges were seen in the Ovsynch group 2 h after the second GnRH, but in the EB group LH peaks occurred apparently later than 20 h after injection and were not detected during the frequent sampling (Figure 1).

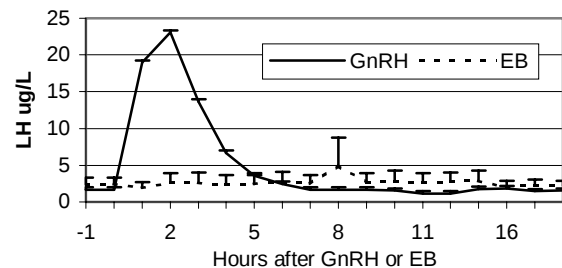


Figure 1. LH response within 20 h after GnRH or EB

All cows in the EB group ovulated, but ovulation occurred earlier and more synchronized in the Ovsynch group, where one cow failed to ovulate (Figure 2), consistent with the LH pattern found in both groups.

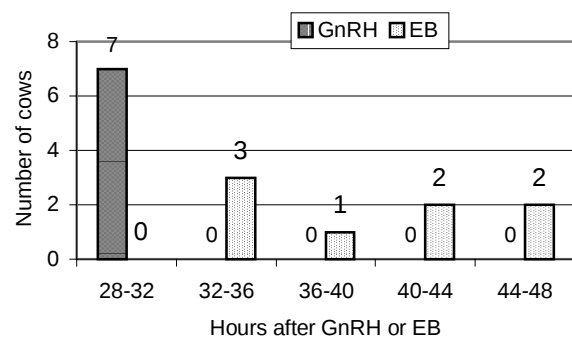


Figure 2. Interval from injection of GnRH or EB to ovulation

The results show that, when started at mid-luteal phase, the Ovsynch synchronized ovulations more precisely than EB treatment.

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