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Folliculogenesis, oogenesis, and superovulation

Prolonged application of recombinant FSH (bscrFSH) in superovulation protocols: in vivo embryo production in Bos taurus cows in tropical environments

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Bovine recombinant follicle-stimulating hormone (bscrFSH) has been used very occasionally in *Bos taurus* superovulation (SOV) protocols. The main aim was to study the effects of prolonged bscrFSH application in SOV protocols to test the differential effects on *in vivo* embryo production in *Bos taurus* cows under tropical environments. A total of 10 healthy Charolais cows (age: ~60 mo.; BW: ~750±50 kg; BCS: 3.75-4.0) located in Morona-Santiago province, Ecuador (Köppen-Geiger: Af; Precip.:~1,200 mm; R.H.:~92%; M.T.:~22 °C latitude: 2°18'22.41"S / longitude: 78°6'55.34"W; altitude: ~1,020 m.a.s.l.) were divided randomly into 2 groups (G1: 4-day bscrFSH (Cebitropin B, Concepción, Chile), and G2: 5-day bscrFSH application; n=5 each). The G1 SOV protocol was applied as follows: Day 0: intravaginal P4 device (CIDR: 1.38 gr) + 2.5 mg intramuscular (i.m.) Estradiol Benzoate E2B + 100 mg P4 (i.m.); Day 4: 180 µg bscrFSH-r/24 h intervals/4 d/4 decreasing doses; Day 6: 3rd bscrFSH dose + two PGF2α i.m. doses (12 h interval/ 500 µg D-cloprostenol each, am/pm); Day 7: CIDR removal at the 4th bscrFSH dose application; Day 8: 0.02 mg GnRH + AI; Day 15: embryo collection. Regarding G2, the same protocol was applied with modifications: Day 0: same; Day 4: 180 µg bscrFSH-r/24 h intervals/5 d/5 decreasing doses; Day 7: 4th bscrFSH dose + two PGF2α i.m. doses (12 h interval/ 500 µg D-cloprostenol each, am/pm); Day 8: CIDR removal at the 5th bscrFSH dose application; Day 9: 0.02 mg GnRH + AI; Day 16: embryo collection. Ovarian-derived traits scored: number of corpora lutea (NCL) and non-ovulated follicles (NOF). Embryo-derived traits scored: total structures (TS), transferable embryos (TE), morulae (M), early blastocysts (EBL), blastocysts (BL), degenerated embryos (DE), unfertilized oocytes (UFOs), and non-transferable structures (NTS). The data were analysed by GLMM (SPSS® 25, USA). Significant differences were observed in EBL (7.75±2.65 vs. 0.75±0.75; p=0.04) and BL (2.50±1.55 vs. 0.20±0.20; p=0.03) in G2 and G1, respectively (p<0.05). Non-significant differences were detected between G1 and G2 SOV protocols when ovarian-derived traits and several embryo-derived parameters (TS, TE, and DE) were compared (p> 0.05). However, significant differences were observed in UFOs (5.75±2.90 vs. 2.00±0.90 for G1 and G2, respectively; p =0.003) and NTS (7.25±2.92 vs. 3.75±0.75 for G1 and G2, respectively; p =0.015) between protocols, being G2 lower in both parameters. In conclusion, no differences were observed regarding ovarian-derived traits between bscrFSH-derived protocols. The G2 protocol was the most efficient for EBL and BL production together with lower values of UFOs and NTS. These differences may be related to a prolonged ovarian stimulation during the application of the G2 SOV protocol in *Bos taurus* cows under tropical conditions. ANID 21201280.

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