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## OPU-FIV

## Effect of melatonin on *in vitro* maturation and culture media on blastocyst production in prepubertal heifers submitted to dietary supplementation

Lucas Costa de Faria<sup>1</sup>, Isabella Rodrigues dos Santos<sup>1</sup>, Otávio Augusto Costa de Faria<sup>1</sup>, Leticia Prates Martins<sup>1</sup>, Adriano Queiroz de Mesquita<sup>2</sup>, Margot Alves Nunes Dode<sup>2</sup>, Roberto Guimarães Júnior, Eduardo da Costa Eifert<sup>2</sup>, Sônia Nair Bão<sup>1</sup>, Carlos Frederico Martins<sup>2</sup>

<sup>1</sup>Universidade de Brasília (UnB)

<sup>2</sup>Empresa Brasileira de Pesquisa Agropecuária (EMBRAPA)

E-mail: lucascdfaria@gmail.com

The present study assessed whether the addition of melatonin at oocyte maturation (IVM) and/or embryo culture *in vitro* (IVC) media would affect oocyte competence and, consequently embryo production in prepubertal heifers nutritionally supplemented post-weaning. For that, 11 pre-pubertal Nelore heifers were supplemented from 7 to 13 months old, with corn silage and energetic-protein concentrate. Following a confinement period, they received a diet consisting of 11 kg of corn silage (33.0% dry matter) and 1.8 kg of concentrate (33.4% crude protein, 72.9% neutral detergent fiber, 2.8 Mcal/kg metabolizable energy) daily. After 3 months, 8 heifers (10 months old) underwent ovum pick up (OPU), without previous hormonal synchronization, for 4 months. Control group oocytes were obtained from cows (n=5). All recovered oocytes were divided into 3 groups: 1) Pre pubertal oocytes (n=390) *in vitro* matured with melatonin (10-9M); 2) Pre pubertal oocytes (n=362) matured (10-9M) and cultured *in vitro* with melatonin (10-9M); Control group (n=237). Previous results of our group have shown the use of 10-9M embryo development *in vitro*, had better results when compared to other concentrations. All groups were exposed to high oxygen tension (20% O<sub>2</sub>) throughout development phases (IVM, IVF, and IVC). Blastocysts yield was assessed at the 7th day of culture (n° of blastocysts/n° of oocytes). By the end of experiment, they underwent a puberty induction protocol and were time fixed artificial inseminated (TFAI). Statistical analysis was performed using ANOVA and Tukey tests (P≤0.05). No significant difference was observed in oocyte quality between heifers and cows (P>0.05), underscoring the importance of the nutritional supplementation of prepubertal heifers and its effect on reproduction. Regarding embryo production, blastocysts yield on D7 was higher in the group with melatonin in IVM and IVC compared to the group with melatonin only in IVC (38.12% vs 25.38%; p<0.05). Control group had greater blastocysts yield when compared to melatonin only in IVM (41.66% vs 25.38%; P<0.05), but there was no difference when compared to melatonin in both IVM and IVC (41.66% vs 38.12%). By the end of the 13th month, all heifers were weighed and had medium weight of 290.82 ± 53.9 Kg. This weight allowed an efficient puberty induction protocol and 54% of conception rate, proving the concept of max exploration of the genetic potential of pre puberty Nelore heifers by the use of biotechnologies of reproduction as IVP or time fixed artificial insemination. Therefore, these results emphasize the importance of nutritional care of growing females and the use of melatonin for IVP in high oxygen tension system for prepubertal heifers. These results also emphasize the importance of using prepubertal heifers as an alternative to reduce the generation interval, making it possible to potentialize genetic enhancement of Brazilian herd. This research was supported by CAPES, FAPDF, and Embrapa.