A311 Cryopreservation and cryobiology, diagnosis through imaging, molecular biology and "omics"

Use of ethyleneglycol monomethyl ether as cryoprotectant in vitrification of IVP bovine embryos

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Keywords: cryoprotectants, ethylene glycol monomethyl ether, vitrification.

Research has been conducted to identify cryopreservation protocols using satisfactory vitrification process. However, little attention was given to the thermodynamic and chemical characteristics of cryoprotectants. The aim of this study was to determine the most effective concentration of ethylene glycol monomethyl ether cryoprotectant (EGMME) in the vitrification solution of in vitro produced (IVP) bovine embryos. This experiment determined the concentration of EGMME in the vitrification solution associated with better hatching rate after warming by measuring hatching rates and gene expression of 405 embryos, in 6 repetitions. The vitrification methodology was described previously by Vieira et al. (Animal Reproduction Science, v. 99, p. 377-383, 2007). On average it was used 22.5 embryos per treatment/repetition. Embryo hatching rate was obtained from the average value of each treatment; 30 warming embryos were transfer to synchronized recipients. The hatching rate of non-vitrified control group (63.8%) was higher ($p<0.05$) in comparison with the treatment of 20% EG and 20% DMSO (T2; 37.6%) and EGMME 20% DMSO and 20% (T3; 22.0%), which was similar ($p>0.05$) between each other. The hatching rate observed in the treatment EGMME containing 15% DMSO and 20% (T4; 10.3%) was lower ($p<0.05$) when compared with other groups. The gene expression of BAX (apoptosis promoter) and CCND2 (proliferation marker) did not differ ($p>0.05$) between groups, but the expression of Bcl-2 gene (inhibitor of apoptosis) was lower ($p<0.05$) in T4 compared with other treatments. Pregnancy rates at 30 days for T2 and T3 groups were both 26.6%. The embryos in T4 were not transferred to recipients. Therefore, EGMME can be used as cryoprotectant in vitrification solutions of IVP bovine embryos.