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Effects of cryoprotectants frozen-thawed procedures on the development of vitrified goat embryos [1]

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Abstract

The aim of this study was to compare the effects of two vitrified cryoprotective methods on the developmental competence of goat embryos after freezing and thawing. In the first experiment, the collected embryos were divided into two groups, ethylene glycol (EG)+ dimethyl sulfoxide (DMSO) group (7 morulas, 15 blastocysts). The first stage frozen formula was 10% EG, 10% DMSO, 0.5 M trehalose and the equilibration time was 5 min. For the second stage 16.5% EG, 16.5% DMSO and 0.5 M trehalose, the equilibration time was 45 sec. EG + PG group (11 morulas, 21 blastocysts): the first stage was 2% EG, 2% PG and 0.4 M trehalose. The equilibration time was 15 min; the second stage was 17.5% EG, 17.5% PG and 0.4 M trehalose. The equilibration time was 30 sec. A total of 99 corpus luteum were observed and 71 embryos were recovered (18 morulas, 36 blastocysts, and 17 aborted embryos). The experimental results showed that regardless of the EG + DMSO group or the EG + PG group, there was no significant difference in the morphological recovery rate after culturing in the incubator under the conditions of 38.8℃, 5% CO_2 and 100% humidity for 2 h (morula: 55.6 ± 9.6% *vs.* 63.9 ± 12.7%, blastocyst: 66.7 ± 23.6% 76.0 ± 2.0%). In addition, the morulas and blastocysts treated with the EG + PG were subsequently subjected to embryo transfer. Again, there were also no significant differences in the pregnancy rate and embryo transfer efficiency of morulas and blastocysts (66.7 ± 28.8% *vs.* 66.7 ± 57.7%, 60.0 ± 15.0% *vs.* 55.6 ± 19.2%). The comprehensive experimental results showed that the efficiency of the combination of EG and PG was similar to the recovery efficiency after thawing with the EG and DMSO. There was no significant difference in the pregnant rate and embryo transfer efficiency of the morula and blastocyst treated with the EG and PG after transfer. The treatment method and strategy of EG + PG can replace the use of highly toxic DMSO, and can be used for freezing and embryo transfer of morula and blastocyst.

Key words: Embryo transfer, Embryo vitrification, Goat.

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