

P-24

**Improved in vitro developmental competence of porcine embryos with citrate supplement in culture medium.**

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Citrate has played a role as an energy substrate and stimulates fatty acid synthesis and is a chelator of metal ions (e.g., Ca<sup>2+</sup>), a feature that may be of importance for maintaining junctional integrity and thus of importance for compaction and blastocoel formation. The objective of our study was to investigate the effect of citrate supplementation, and the effects of a two-step culture system, which involves the use of potential culture condition for both early cleavage and later stage embryos, on the developmental competence of porcine embryo derived from in vitro fertilized (IVF). Ovaries were collected from gilts at a local slaughterhouse and cumulus-oocyte complexes were matured for 44 hr in the modified tissue culture medium (TCM)-199 and fertilized in mTBM for 6 h. In Experiment 1, the IVF embryos were cultured in modified North Carolina State University (mNCSU)-23 medium supplemented with various concentrations (0, 0.5, 2.5 or 5 mM) of citrate. In Experiment 2, embryos were cultured for 6 days in mNCSU-23 medium supplemented with 0.05% PVA, 0.4% BSA plus citrate or

