

Suitability of semen oxidative stress test for predicting freezability of boar semen

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Semen cryopreservation has many benefits, including long-term preservation, long-distance transportation, reducing cost for importing, and reducing risk of disease transmission. However, the process of cryopreservation can damage boar sperm resulting in reducing reproductive performance. Studies have shown that the freezability of boar sperm can vary between boars and ejaculates. Therefore, finding sperm with good freezability might be the key for better application of boar semen cryopreservation. Oxidative stress has been shown to be one of the main damages during sperm cryopreservation. In this study, we established H₂O₂-induced oxidative stress test mode to analyze the correlations between fresh or oxidative stress test semen with the boar frozen semen quality, and to evaluate the applicability of oxidative stress testing as a predictor of freezability of boar semen. The fresh semen collected from 64 adult boars were applied an oxidative stress test by 50 μ M H₂O₂ for 3 hours. After the boar semen was frozen and thawed, the semen quality was evaluated respectively after thawing short-term (30 minutes) and long-term (3 hours) incubation at 37 °C in order to analyze the correlations with those of fresh and oxidative stress semen before cryopreservation. The results showed that the coefficients of variation of all semen quality parameters increased after oxidative induction. Several sperm parameters of fresh and oxidative stress test semen were positively correlated with those of short-term thawed semen. All sperm parameters of oxidative stress test semen were significantly positively correlated with mitochondria activity (LMA) of thawed short-term semen ($P < 0.05$), but not found in fresh semen. Also, several oxidative stress test sperm parameters were positively correlated with those of long-term thawed sperm and the LMH parameter had the highest positive correlation coefficient (0.43, $p < 0.01$) with that of long-term thawed sperm. It was easier to recognize the boar semen freezability by oxidative stress test. The total motility and LMH of oxidative stress test were good indicators for assessing short and long term thawed sperm freezability, respectively. The results suggested that the oxidative stress test may be feasible for assessing the freezability of boar semen.

Key words: semen cryopreservation, oxidative stress test, freezability