EFFECTS OF VITAMINS ON THE QUALITY AND FERTILITY OF BOAR SEMEN AFTER LIQUID PRESERVATION AT 5°C

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Liquid preservation can be used as an alternative to freeze-thawing for preserving semen for artificial insemination. The efficiency of some boar semen extenders has been studied over storage periods of 5–7 days. The objective of this study was to evaluate the viability and penetrability of boar spermatozoa preserved at 5°C in a modified modena-based extender supplemented with either 100 µM vitamin C (Vc), 100 µM vitamin E (Ve), or 100 µM Vc + 100 µM Ve (Vc + e). The final sperm concentration was adjusted to 1 × 10^{8}^ cells mL^{-1}^, and the semen was then stored at 5°C for 4 weeks. In experiment (Exp.) 1, the semen samples were assessed every week during the 4-week storage in each extender for the following factors: motility, by using computer-assisted sperm analysis (CASA); viability, by using the Live/Dead fluorescence viability assay; plasma membrane integrity, by using the hypoosmotic swelling test (HOST); and acrosome integrity, by using fluorescein isothiocyanate (FITC)-labeled peanut agglutinin staining. In Exp. 2, we examined the penetrability of spermatozoa that had been stored in each extender for 4 weeks and the development of fertilized oocytes. Data were analyzed using analysis of variance (ANOVA). In Exp. 1, when the semen was stored for 2 weeks, the mean percentage values of total sperm motility and viability for semen stored with Ve were significantly higher than those for semen stored without Vc and Ve (control group) (84.3% vs. 67.9% and 59.8% vs. 51.2%, respectively; $P < 0.05$). Moreover, the percentage sperm motility for semen stored for 4 weeks tended to be higher in the Ve group than in the control group (44.2% vs. 32.7%; $P < 0.1$). Storage with Vc or Vc + e did not improve sperm motility and viability of semen. The plasma membrane integrity and acrosome integrity of semen did not significantly differ among the groups during the 4-week storage. In Exp. 2, the rates of sperm penetration and of development to blastocysts of fertilized oocytes did not differ between the Ve and control groups (33.0% vs. 28.5% and 14.9% vs. 10.1%, respectively; $P > 0.05$). However, storage with Vc reduced the rate of oocyte development compared with the Ve and control groups (1.1%; $P < 0.05$). In conclusion, adding Ve to the semen extender may improve the motility and fertility of boar semen stored at 5°C. However, adding Vc has a harmful effect on the quality and fertility of stored boar semen.