SEMEN CRYOPRESERVATION AND QUALITY OF FROZEN-THAWED SEMEN IN TAIWAN HOLSTEIN BULL

Chia-Xin Lee[1, 2], Ming-Kuew Yang[1], Yi-Hsin Yeh[1], Szu-Han Wang[1], Pin-Chi Tang[2] and Jen-Wen Shiau[1]

[1] Hsin-Chu Branch, Livestock Research Institute, Xihu, Miaoli 36843, Taiwan, R.O.C.

[2] National Chung Hsing University, Taichung 40227, Taiwan, R.O.C.

Introduction

Semen cryopreservation has been one of the important reproductive techniques and widely used in the farm animal industry. Additionally, it could be served as transmission of genetic materials and preservation of gene banks. However, cryopreservation may result in impairing spermatozoa, including reduction of sperm viability, motility, fertilization ability, acrosome reaction, cytoplasmic membrane integrity, and increasing DNA damage. Due to a high content of unsaturated fatty acids in the cell membranes, and lack of significant antioxidants contained in the cytoplasmic components, sperm cells are susceptible to lipid peroxidation by O_2^- and H_2O_2.

Materials and Methods

The youth bulls were chosen in line with Taiwan DHI data ranking and also be the Ten Tons Cow's offspring. Comparison of the quality of frozen-thawed semen among five different extenders was conducted, which are two commercial cryopreservation extenders, i.e. Bioxcell and OptiXcell, and Tris-citric acid-fructose with 8% low density lipoprotein (TCF-8% LDL) extender supplemented with various concentrations of Glutathione (GSH), i.e. TCF-8% LDL, TCF-8%LDL+0.5 mM GSH and TCF-8% LDL+1 mM GSH. Semen were collected from three Holstein bulls by using an artificial vagina, then were diluted with different extenders accordingly to bring to 2~3 x 10^8 cell/ mL in the final concentration. After frozen- thawed semen, the percentage of live sperm, motility and the acrosome integrity of spermatozoa were recorded by CASA and flow cytometry.

Results and Discussion

The results showed that the OptiXcell and TCF-8% LDL+0.5 mM GSH extenders performed well on sperm motility (68.63% vs. 62.05%), viability (60.92% vs. 58.76%) and integrity of mitochondria (72.42% vs. 63.95%) after thawing. In addition, the acrosome integrity (39.05%) is higher in the group of TCF-8% LDL+0.5 mM GSH than other groups.