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Poster Presentations

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The effects of glycerophospholipid micelles on the thawed rooster semen

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Background: Today, with the expansion of commercial poultry farms, artificial insemination is used as an efficient method to improve livestock and poultry reproduction programs. For this reason, techniques such as sperm cryopreservation make reproductive programs more efficient. However, due to the abundance of unsaturated fatty acids in plasma membrane, sperm is sensitive to the freezing-thawing process, and sperm cryopreservation increases peroxidation of membrane lipids, decreases membrane integrity, and consequently decreases sperm fertility.

Objective: Membrane lipid replacement with oxidized membrane lipids would restore cellular membrane, and improves its stability. The aim of this study was to investigate the effects of glycerophospholipid micelles on the cryo-survival of thawed rooster semen.

Materials and Methods: Semen samples were collected from six 29-wk Ross broiler breeder roosters, twice a wk, then mixed and divided into five equal parts. The samples were diluted with the Beltsville extender containing different concentrations of glycerophospholipid micelles (GPL) according to the following groups: 0% (GPL-0), 0.1% (GPL-0.1), 0.5% (GPL-0.5), 1% (GPL-1), and 1.5 % (GPL-1.5), then diluted semen was gradually cooled to 4 °C during 3 h and stored in liquid nitrogen. The optimum concentration of GPL was determined based on the quality parameters of thawed sperm such as total motility, progressive motility, viability, apoptosis rate, malondialdehyde level, membrane integrity, and mitochondrial membrane potential.

Results: Exposure of sperm to GPL-1 significantly increased total, progressive motility, average path velocity (VAP), straight linear velocity (VSL), and curvilinear velocity (VCL), and the percentage of viability and membrane integrity were significantly higher in the GPL-1, and GPL-1.5 groups compared to the other groups ($p < 0.05$). Moreover, the lowest rate of apoptosis and lipid peroxidation were observed significantly in GPL-1 and GPL-1.5 groups in comparison to the frozen control group. Mitochondrial activity of thawed sperm was not affected by GPL ($p > 0.05$).

Conclusion: Our findings indicated that membrane lipid replacement with GPL micelles (1%-1.5%) could substitute damaged lipids in membrane and protect sperm cells against cryoinjury.

Key words: *Cryopreservation, Rooster semen, Glycerophospholipid.*