BULLS SPERMATOZOA SURVIVAL AND FERTILIZING ABILITY AFTER ADDITION IN DILUTED EJACULATES MICROELEMENTS LINKED WITH POLYMER-TRANSPORTER

I. Yaremchuk[1], N. Kuzmina[1], D. Ostapiv[1], M. Sharan[1], S. Kava[2], O. Chajkovska[3], V. Oleksa[4], M. Nagornjak[4], I. Dron[4], V. Samaryk[4], S. Varvarenko[4]

[1]Institute of Animal Biology of NAAS
38, Stusa str., Lviv, 79043, Ukraine

[2]Lviv National University of Veterinary Medicine and Biotechnologies named after S. Z. Gzhytskyi 50, Pekarska str., Lviv, 79010, Ukraine

[3]State Scientific Research Control Institute of Veterinary Medicinal Products and Feed Additives
11, Donetska str., Lviv, 79019, Ukraine

[4]Lviv Polytechnic National University
12, S. Bandery str., Lviv, 79013, Ukraine

Influence of microelements (Cu^{2+}, Zn^{2+} and Mn^{2+}) linked with polymer-transporter on survival and fertilizing ability of bull spermatozoa was studied. For evaluation of effect of microelements linked with PEG400 N- derivative, bull ejaculates with such characteristics were obtained: volume 2–5 ml, spermatozoa concentration – $0.7–1.2\times10^9$ cell/ml, spermatozoa movement activity 7.0–8.0 points. Sperm, diluted with lactose-yolk-glycerol diluent, was divided into parts: control - without addition and experimental - with the addition of microelements linked with PEG400 N- derivative (N-PEG400) with concentration in 1 ml: Zn^{+2} – 0.0319 mmol; Cu^{+2} – 0.0222 mmol; Mn^{+2}- 0.0359 mmol. In the experimental samples were added 0.01, 0.05 and 0.1 ml of solutions of microelements in the polymer in concentrations: initial and in 100 times lower in ml of diluted ejaculates. In the control and experimental samples of diluted sperm, the survival of spermatozoa and activity of succinate dehydrogenase - marker enzyme of spermatozoa fertilization ability were determined.

It was established that microelements linked with the N-derivative of PEG 400 at low doses (0.01 ml / ml of semen) at initial concentrations are characterized by weak influence on the survival of spermatozoa, and higher doses (0.05 ml and more) decrease ($p < 0.01–0.001$) the magnitude of the physiological index. The use of 0.01 and 0.05 ml in a diluted bull sperm in 100 times lower concentrations of Cu^{2+}-N-PEG400,

compared with initial, lead to an increase of spermatozoa survival on 6.7-10.1 hours (4.7 – 6.9%), and at higher doses it did not change the duration of survival (133.7 hours). Zn^{2+}- and Mn^{2+}-N-PEG400 at initial concentrations and 100 times lower have a weak effect on activity of succinate dehydrogenase, the value is in the range of 30.0 - 40.0 units / hour × 0.1 ml of sperm.

Addition of 0.01 ml Cu^{+2}-N-PEG400 in ml of diluted sperm, as in initial and in 100 times lower concentration did not influence SDH activity, and when added more than 0.05 ml in ml of diluted semen – it inhibited enzymatic activity ($p < 0.01$).

Keyword: MICROELEMENTS, POLYMER-TRANSPORTER, SPERMATOZOA, BULLS.