

# SPERMATOZOA QUALITY AFTER ADDITION OF NANOSUCCINATES OF METALS TO DILUTED RAM EJACULATES

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The influence of microelements ( $\text{Cu}^{2+}$ ,  $\text{Zn}^{2+}$  and  $\text{Mn}^{2+}$ ) in the form of nanosuccinates on the quality of the spermatozoa in the diluted ram ejaculated was studied. It was established that the respiratory activity of ram semen was  $0.67 \pm 0.09$  ng-atom  $\text{O}_2/0.1 \text{ ml} \times \text{min}$ . After adding increasing doses of  $\text{Zn}^{2+}$ -nano-succinates sperm respiratory activity was lower on 65.7 – 88.1 % ( $p < 0.01 - 0.001$ ), comparing to control. When adding 0.004 mg/ml of  $\text{Cu}^{2+}$ -nano-succinate respiratory activity was on control level ( $0.63 \pm 0.12$  ng-atom  $\text{O}_2/0.1 \text{ ml} \times \text{min}$ ), when adding 0.04 mg/ml it was lower on 88.1 %, and when adding 0.40 mg/ml – sperm was not consuming oxygen but, releasing it. The respiratory activity of sperm is less dependent on  $\text{Mn}^{2+}$ -nano-succinate: the growth of its content in diluted sperm is 10 times lowered by 31.1 – 33.4 % the value of the index ( $p > 0.05$ ).

The activity of mitochondrial enzymes after the addition of microelements nanosuccinates in diluted ejaculates of rams varies ambiguously. When adding  $\text{Zn}^{2+}$ -nanosuccinate the activity of mitochondrial enzymes did not change and was within range: SDH 15.0 – 16.2 and CO 36.2 – 45.0 UI/0,1 ml×h. Addition of increasing doses of  $\text{Mn}^{2+}$ -nanosuccinate stimulates the activity of SDH of ram spermatozoa: when adding 0.01 mg/l to diluted ejaculates activity of enzyme was higher on 36.8 %, and when adding more than 0.1 mg/l – on 45.9 – 47.4 % ( $p < 0,01$ ), comparing to control. CO activity did not depend on  $\text{Mn}^{2+}$ -nanosuccinate dose and was on control levels (43.3–49.2 UI/0,1 ml×h). Addition of 0.004 mg/l of  $\text{Cu}^{2+}$ -nanosuccinate increased SDH activity on 48.8 % ( $p < 0.05$ ), when adding 0,04 and 0,4 mg/l, on the contrary, decreased, respectively, on 31.7 and 47.5 % ( $p < 0.05$ ). Simultaneously, addition of 0.004 mg/l  $\text{Cu}^{2+}$ -nanosuccinate did not change, and when adding 0.04 and 0,4 mg/l CO activity increased on 32.6 and 42.1 % ( $p < 0,001$ ). A negative correlation of medium

force between ( $\eta^2 = 0.554\text{--}0.659$ ) respiratory activity of ram sperm and increasing doses of  $\text{Zn}^{2+}$ - and  $\text{Cu}^{2+}$ -nanosuccinates in diluent, and between SDH, CO activities and spermatozoa survival when adding  $\text{Cu}^{2+}$ -nanosuccinate were detected. A positive correlation of medium force between SDH activity and increase of  $\text{Mn}^{2+}$ -nanosuccinate concentration in diluted ram semen was detected ( $\eta^2 = 0.345$ ). Survival of spermatozoa after addition of  $\text{Zn}^{2+}$ -,  $\text{Mn}^{2+}$ -nanosuccinates in high doses had a tendency to decrease, and after adding of  $\text{Cu}^{2+}$  -nanosuccinate it decreased ( $p < 0.05\text{--}0.001$ ).

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