

THE EFFECT OF NON-IONIZING ELECTROMAGNETIC RADIATION ON SPERMATOOZA QUALITY – RELATION TO TRANSPORT RISKS

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Abstract Body

The objective of this study was to analyse the impact of the non-ionizing radiation on motility and DNA fragmentation of the bull spermatozoa. The spermatozoa diluted with the physiological solution and yolk diluent were analyzed. The spermatozoa, diluted by the physiological solution, were exposed to the impact of the hand-held metal detector for 10 seconds, 15, 30 even 60 minutes. The spermatozoa with the yolk diluent were divided into two groups. Both groups were irradiated for 10 seconds, one minute and 5 minutes by the hand-held detector. The first group was irradiated before cryoconservation and the second one after defrosting. After the evaluation the motility of bovine spermatozoa by the computer assisted sperm analyzer (CASA) was monitored. Total motility (%), progressive motility (%) and other parameters as DSL, VSL, BCF were evaluated. Each sample was also undergone the genetic analysis to find out the fragmentation of spermatozoa DNA after radiation. In the motility evaluation we recorded the decrease ($p < 0.01$) in motility of the sample irradiated for 15 minutes, containing the spermatozoa diluted with the physiological solution in comparison with the control sample. It was also proved that the significant decrease ($p < 0.01$) in motility of the sample irradiated for 60 minutes was detected in comparison with the control sample. The spermatozoa which were irradiated before the cryoconservation for 10 seconds, one minute and 5 minutes did not prove significant decrease in the parameters of motility and progressive movability. The motility of the samples irradiated for 10 seconds showed significant decrease ($p < 0.01$) in comparison with the control sample ($68.05 \pm 5.63\%$). The samples irradiated for one minute and for 5 minutes showed even higher decrease ($p < 0.05$) 60 minutes after irradiation. The progressive motility of the irradiated samples similarly decreased as motility. While evaluating the genetic analysis no DNA damage in any of the samples was detected. The results of this study indicate the negative impact of the non-ionizing radiation on the bull spermatozoa cultivated at 37°C under the in vitro conditions. The research was financially supported by the VEGA 1/0539/18, 1/0760/15 and APVV-16-0289.