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Concentration of Copper, Iron, Zinc, Cadmium, Lead, and Nickel in Bull and Ram Semen and Relation to the Occurrence of Pathological Spermatozoa

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Abstract

In this study the concentration of copper, iron, zinc, cadmium, lead, and nickel in bull and ram semen and relation of these metals to spermatozoa morphology was investigated. Analysis by atomic absorption spectrophotometry showed that copper concentration was significantly higher ($p < 0.0001$) in ram semen in comparison with bull semen. The zinc concentration was higher in bull semen in comparison with ram semen. The iron and cadmium concentrations in the semen were similar. Higher concentration of lead was found in ram semen. Higher levels of nickel were found in ram semen in comparison with bulls. In bull semen 11.79 ± 4.88% of pathological spermatozoa was found. Higher occurrence of pathological spermatozoa was in ram semen (17.17 ± 3.76) in comparison with the semen of bulls. Separated tail, tail torso,

and knob twisted tail were the most frequent forms of pathological spermatozoa in both species. Correlation analysis in bulls showed high positive relation between iron and zinc (r = 0.72), nickel and separated tail (r = 0.76), separated tail and tail torso (r = 0.71), tail torso and total number of pathological spermatozoa (r = 0.72), and between tail ball and total number of pathological spermatozoa (r = 0.78). In rams high positive correlation between cadmium and lead (r = 0.98), nickel and separated tail (r = 0.77), separated tail and total number of pathological spermatozoa (r = 0.69), knob twisted tail and retention of cytoplasmic drop (r = 0.78), and between knob twisted tail and other pathological spermatozoa (r = 0.71) was found. High negative correlation in ram semen was observed between copper and nickel (r = 0.71), copper and separated tail (r = 0.70), and between iron and tail torso (r = 0.67). The results suggest that the studied metals have a direct effect on spermatozoa quality.

Keywords:

Trace elements | Semen | Pathological spermatozoa | Bull | Ram

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