

Effect of zinc treatments on lead exposed periparturient bovine lymphocytes *in vitro* on their proliferation and superoxide dismutase (SOD) expression

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During peripartum period, high yielding dairy cows experience metabolic stress and lead exposed further enhances reactive oxygen species production, which alters homeostasis and exposes the cows to illness. The aim of this study was to observe adverse effects of lead (Pb) treatments and protective effect of Zinc (Zn) on lymphocyte proliferation and to quantify the expression levels of superoxide dismutase (Cu/ZnSOD) genes involved in antioxidants defenses in Periparturient Karan Fries cow. In vitro studies were conducted for this blood was sampled at 30 and 15 days before (expected calving date) and 15 and 30 days after calving. A fixed no. of cells (2×10^6) were grown in culture for 72 hours with different levels of Pb (10^{-4} , 10^{-5} , 10^{-6} M) and their adverse effects were counteracted by Zn (50, 55, 60 μ M) and analysed for the lymphocyte proliferation (MTT assay) and for the expression level of Cu/ZnSOD using the real-time PCR technique with Light Upon Extension (LUX) fluorogenic primers. Pb dosage had no adverse effect and the overall mean proliferation values were indicated that 60 μ M Zn may be optimum for maximizing lymphocyte proliferation. The Cu/ZnSOD mRNA expression in lymphocytes was higher ($P < 0.05$) at higher dosage of Pb in comparison to lower dosage in all the three (50, 55, 60 μ M) Zn treatments. There was no significant difference ($p < 0.05$) in different levels of Zn on SOD expression. Cu/ZnSOD mRNA expression decreased ($P < 0.05$) from -30 days to 0 days but increased from 0 to 30 days after calving. The results suggest that the Zn may have a ameliorative effect on Pb exposed oxidative stress on lymphocytes proliferation and Cu/ZnSOD mRNA expression through modulation of superoxide dismutase expression.

Biography

Dr. Muneendra Kumar has completed his B.V.Sc. & A.H. at the age of 25 years from Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya Evam Go Anusandhan Sansthan (DUVASU) Mathura – 281001 (India), post graduation in animal nutrition from National Dairy Research Institute, Karnal (awarded Junior Research Fellow by Indian Council of Agricultural Research for post graduation programme) and now perusing Ph.D. from same University. He has published more than three papers and eight abstracts in national and international conferences.

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