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Título artículo: Effect of mineral supplementation on lead bioavailability and toxicity biomarkers in sheep exposed to mining pollution

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Autores: Pareja-Carrera J, Martinez-Haro M*, Mateo R, Rodriguez-Estival J.

*Instituto Regional de Investigación y Desarrollo Agroalimentario y Forestal (IRIAF), CIAG del Chaparrillo, 13071 Ciudad Real, Spain

RESUMEN: The chronic exposure of livestock to lead (Pb) pollution in historical mining areas may represent significant and unnecessary costs for farmers and primary producers, in addition to important food safety risks. Here, we evaluate the effect of mineral supplements, in the form of a commercial mineral block (MB), to reduce Pb bioavailability and toxicity in sheep through an experimental approach under real farming conditions in an abandoned mining area. Blood, fecal Pb levels, and soil ingestion, along with different blood and plasma biomarkers were studied. Experiment 1 was carried out with 3-months-old female lambs, $n = 54$, fenced in two contiguous MB and non-MB-supplemented plots. After 20 days of treatment, blood Pb level was lower in MB supplemented sheep than in those that were non-MB-supplemented. Experiment 2 was carried out with 2-months-old female lambs, $n = 34$, fenced in a single plot and MB-supplemented during the first 20 days of experiment. After MB supplementation, blood Pb level in sheep was also reduced by almost half, falling below the threshold of subclinical intoxication, and then increased again after 20 days without MB. Experiment 3 was carried out with adult rams, $n = 10$, fenced in a single MB-supplemented plot during the first 20 days of experiment. In this case, blood Pb level decreased by day 40. Soil ingestion was not reduced by MB supplementation in any of the experiments. MB supplementation favoured antioxidant status by increasing SOD activity and reducing GPX activity and MDA levels. In conclusion, the MB supplementation seemed to reduce Pb bioavailability by increasing its fecal excretion, but renal excretion and bone deposition may also have favored the reduction of blood Pb concentration. Mineral supplements may be a new easy-to-apply and cost-effective way to reduce livestock exposure in Pb polluted sites.

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