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Título artículo: In vitro assessment of mineral blocks as a cost-effective measure to reduce oral bioavailability of lead (Pb) in livestock

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RESUMEN: Soil contamination in former mining districts is a persistent problem resulting from the historic lack of legal requirements asregards land restoration after mine closures. Much of this polluted land is currently being used worldwide for livestock and biggame production, with the consequent health risks for the animals exposed and the subsequent threats to food safety. Soilremediation and restoration may be unfeasible or difficult to accomplish in the short term when pollution affects large territoriesand other alternatives must, therefore, be explored in order to reduce the probability of grazing animals being exposed to thiscontamination. In this paper, we study the use of mineral blocks (MBs) as a potential alternative by which to reduce the oralbioavailability of lead (Pb) in polluted soils by means of a simplified in vitro assay simulating gastrointestinal pH conditions. Experiments were carried out with twelve commercial MBs of different compositions in order to identify the most useful to betested in further in vivo bioavailability studies. The results showed that one of them reduced the bioaccessibility of Pb frompolluted soil by 88.2% and 75.9% under gastric and intestinal conditions, respectively, when compared with assays containingonly polluted soil without MBs. The MB in question had the highest phosphorus content (7%) and one of the highest calciumcontents (10%) of all those tested. Furthermore, negative correlations were detected between the content of calcium and phos-phorus in the MBs and the percentage of bioaccessible Pb under gastric conditions, and between phosphorus and bioaccessible Pbunder intestinal conditions. The use of MBs with a high phosphorus and calcium content should consequently be tested in vivo asa cost-effective (€0.6–1.5/sheep/month) tool by which to reduce the bioavailability of Pb for extensive grazing livestock reared incontaminated areas.

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