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Metal transfer ratios from soil to plants and the risk they pose to human and livestock: An example of the Berg Aukas and Tsumeb mining districts, Namibia.

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ABSTRACT

The towns of Tsumeb and Berg Aukas have been sites of smelting and mining for many years. Consequently the soils in the surrounding of the smelters (Tsumeb) and former smelter at Berg Aukas are heavily contaminated by heavy metals (1, 2). Mapani, Kribek, Ettler). In well-aerated acid soils, several metals (Cd and Zn in particular) are easily mobilized and available to plants, while in poorly aerated neutral or alkaline soils, metals are substantially less available to plant metabolism (3). Transfer ratios vary between Berg Aukas and Tsumeb, e.g., ratios for plant:soil for As in Berg Aukas is 0.125 and 0.09 in Tsumeb for similar plants; Cu 0.067 in Berg Aukas compared to 0.0014 in Tsumeb and Pb is 0.007 in Berg Aukas compared to 0.002 in Tsumeb. The emissions from these smelters has led to an environmental risk associated with metal to plant transfer and eventually to humans. In Namibia, there exists no legislation on the contamination and pollution of farmland, while at the same time research has shown that in countries where such legislation exists, the risk to the population is highly reduced. This study has examined the metal-to plant transfer ratios, especially in grass and correlated it to the risk posed to cattle and humans. This risk, in case of certain metalloids such as arsenic and metals such as cadmium and lead may be irreversible. It is the premise of this study that legislation need to be put in place that limits the quantities of gaseous emissions in areas where smelters and tailings are located so as to protect local population.

References.

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