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Speciation and quantification of mercury in contaminated soils of the rural area of Descoberto – Minas Gerais, Brazil

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Toxicity, bioavailability and mercury mobility in the environment depend on its oxidation as well as on its different chemical forms. Metallic mercury occurred in the Serra do Grama region, a rural area of Descoberto in December 2002. According to inhabitants` reports, “Silver Balls” appeared in this ancient gold mining area. The region of Descoberto was included in the gold exploration route that existed in the 19th century.

After mapping the region, a diagnosis of contamination and risk was made (1) and the contaminated area was isolated. Information on mercury speciation is of great importance because oxidation of metallic mercury may generate soluble species (Hg^{+2}) and, thus, make it more movable in the environment. The metilation processes, as well as the application of any intervention in order to decontaminate this area, depend on the state of the metal oxidation.

This work aimed at obtaining the first data on mercury speciation and mercury quantification in soil and sediment of this contaminated area in Descoberto, Minas Gerais. Thermo desorption technique coupled with a Atomic Absorption equipment (TDAAS) was used focusing on investigating the processes of mercury behavior in the soil of this site and Direct Analyzer of Mercury (DAM) in order to quantify the total mercury in the samples.

Concentrations of Hg from 0.0371 to 161mgkg^{-1} were found, according to the distance from the sampling site to the hotspot of contamination, already known from previous works (1). The speciation study showed the presence of both metallic and oxidized mercury in samples near the hotspot and only oxidized mercury in many samples with concentrations as high as 90 mgkg^{-1} of total mercury. It means that mercury oxidation occurred at that place, being a great part adsorbed by the soil and another small part lixiviated by the rains together with small particles of soil. This was confirmed in studies of the particulate material collected in waste tanks, placed in this area, in order to avoid the moving of this material contaminated by Hg to a stream in the surrounding area.

(1) RELATÓRIO FEAM (RE-DIMOG-001/2005) E CDTN (945/2005), Mauro Campos Trindade (FEAM), Carlos Alberto de Carvalho Filho (CDTN) Otávio Eurico de Aquino Branco (CDTN), Diagnóstico da Contaminação Ambiental em Descoberto, Minas Gerais, em decorrência do afloramento de mercúrio em dezembro de 2002.