

Lead concentrations in urban house dust from Portugal

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Lead (Pb) is a naturally occurring element that with the advent of the industrial era became a serious environmental issue. Human activities such as mining, smelting, several types of combustion and battery manufacturing contributed to the current loads of this element in the ecosystems. Together with leaded gasoline, lead based paints were the major sources of exposure for the general population during the 20th century. This metal is responsible for neurological, cognitive and behavioral disorders. In order to decrease lead exposure, several control measures were adopted to regulate lead in paint, petrol, food cans and piping. In Portugal, the use of leaded gasoline and lead-based paints was banned in the 1990s. Nevertheless, lead is still used in many consumer products including ceramic food ware and crystal ware, cosmetics, jewelry and toys. Human exposure to lead can occur via food, water, dust, air and soil. House dust, in particular, is considered one of the most significant contributors to the total body burden of lead

in infants and children, which even at low doses affects their intellectual development. Despite this, no data is available for lead house dust levels in Portugal. In this pilot study twenty seven houses were surveyed. Quantification was performed by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry) on sieved dust samples collected from vacuum cleaner bags. Lead dust concentrations were highly variable (from 33.0 up to 2000 $\mu\text{g}\cdot\text{g}^{-1}$) thus reflecting the existence of multiple and variable lead sources into the indoor environment. The obtained median value (105 $\mu\text{g}\cdot\text{g}^{-1}$) is similar to the ones reported for other locations worldwide. Since lead, unlike other elements, is highly bioavailable it is possible that its presence in house dust results in potential health risks. In the case of the houses where the highest levels were detected, if dust ingestion rates and Tolerable Daily Intake (TDI) for lead described in the literature are considered, dust ingestion alone exceeds the TDI.

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