

Lead in Chinese villager house dust

Xiangyang Bi, Jinling Liu, and Zhixuan Han

China University of Geosciences, China (bixy@cug.edu.cn)

House dust has been recognized as an important contributor to children's blood Pb. Here we conducted a comprehensive study to investigate geographical variation of Pb in Chinese villager house dust. The concentrations of Pb in 477 house dust samples collected from twenty eight areas throughout China varied from 12 to 2510 mg/kg, with geometric mean and median concentration of 54 mg/kg and 42 mg/kg, respectively. The median Pb concentrations in different geographical areas ranged from 16 (Zhangjiakou, Hebei) to 195 mg/kg (Loudi, Hunan). The influences of outdoor soil Pb concentrations, dates of construction, house decorative materials, heating types, and site specific pollution on Pb concentrations in house dust were evaluated. No correlations were found between the house dust Pb concentrations and the age of houses, as well as house decorative materials. Whereas outdoor soil, coal combustion, and site specific pollution may be potential Pb sources. The results of scanning electron microscopy (SEM) showed that Pb bearing particles appeared as cylindrical, flaky and irregular aggregates with the particle size ranging from about 10 to 800 μm . The energy dispersive X-ray microanalysis (EDX) suggested that Pb in the dust particles may be associated with calcium compounds. But the major fraction of Pb in the household dust samples was found to be strongly bound to Fe-Mn oxide phases (37%) while Pb present in minor fractions individually making up between 14 and 18% was characterized in falling order as residual, carbonate, organic/sulphide and exchangeable fractions by the sequential extraction method applied. Bioaccessible Pb making up an average proportion of 53% in the household dusts was significantly correlated to the Fe-Mn oxide phases of Pb.