Yellow Mexican Playground Paint contains Crocoite

ILPPWA 2026-released research is co-authored by Mark Taylor*

*[*Editor's note: Professor Mark Taylor is a member of The LEAD Group's Technical Advisory Board]*

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Abstract

Lead exposure remains a major global health concern, particularly for children. Following the phase-out of leaded gasoline, lead-based paints have become an important potential exposure source in countries with weak regulations. This study investigated painted coatings and soils from 19 public playgrounds in Hermosillo, Mexico. Portable X-ray fluorescence revealed very elevated Pb concentrations in yellow paints (mean = 142,226 mg·kg−1), far exceeding the United Nations threshold of 90 mg·kg⁻1, alongside elevated Cr, As, Ba, Ti, and S concentrations. Conversely, playground soils reflected background geochemistry. Analyses of the painted coatings by X-ray diffraction, Raman spectroscopy, and Scanning electron microscope confirmed the use of **crocoite (PbCrO4)** pigments, rutile (TiO2) and barite (BaSO4). Lung bioaccessibility showed low Pb and Cr solubility in Gamble solution (< 1%), whereas higher dissolution occurred under artificial lysosomal conditions (ALF), reaching 8.6% and 20.3%, respectively. Predictive modeling estimated blood lead levels (BLL) of 1.2 to 1.9 µg·dL⁻1, below the Centers for Disease Control and Prevention reference value (3.5 µg·dL-1), yet non-negligible; comparison with default soil-ingestion inputs confirmed that inhalation represents a minor pathway, while ingestion remains the dominant contributor to modeled BLL. While non-carcinogenic risks were below threshold levels, carcinogenic risks for Cr(VI) exceeded benchmark values. These findings indicate that deteriorating playground paints may represent localized sources of Pb- and Cr-bearing particles. Although modeled inhalation risks were low, the continued presence of lead chromate pigments supports the need for vigilance and preventive measures to minimize potential exposure.