

Heavy metal content and fungal resistance of paints available in the local market

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Heavy metals and their compounds can have adverse effects on human health. Humans are exposed to these metals by inhalation, ingestion or dermally. Heavy metals have been used in many different applications, including paint industry, building materials, pigments for glazing ceramics, and pipes for transporting water. Paints are used to protect substrates and to provide an attractive appearance by acting as a barrier against environmental conditions. Water-based paints contain heavy metals which are used as binding agents. Discoloration of the surface paint film, or bio deterioration, can be caused by microbial colonization such as fungi and algae, deposition of dust, and weathering processes such as acid rain.

Analysis of heavy metals for different categories of paint was conducted by using flame atomic absorption spectrometry (FAAS), and resistance to fungal growth according to an established protocol.

Four different brands from different categories of paint samples were obtained from the local market to check the heavy metal content and fungal growth resistivity. The paints were of different categories, enamel paints, emulsion exterior paints, and emulsion interior paints. The paint samples had to be processed before being analyzed. For the measurement of heavy metal content, the samples had to undergo acid digestion. For the determination of water soluble heavy metals, an acid extraction process was used. The digested samples were analyzed using Flame Atomic Absorption Spectroscopy.

Four different brands of emulsion interior paints, A, B, C, and D were analyzed. Lead content in all four brands were < 1.0 ppm, which is less than the detection limit. No fungus or algae growth were observed after 5 months of exposure.

Emulsion exterior paints from the same four brands, A, B, C, and D were analyzed. The lead content in all four brands were < 1.0 ppm, which is less than the detection limit. No fungus or algae growth were observed after 5 months of exposure.

Enamel paints from three brands, B, C, and D were analyzed. The heavy metal analysis showed that in brand B; Pb, Cr, Cd, Hg, and Co contents were all less than 1.0 ppm, and therefore below the detection limit. In brand C; Pb, Cr, Cd, Hg and Sb were all less than 1.0 ppm, and therefore below the detection limit. However, Co content was 56.56 ppm, and Ba content was 112.55 ppm. In brand D; Pb, Cr, Cd, Hg, and Sb were less than 1.0 ppm, and therefore below the detection limit. However, the Co content was 60 ppm, and Ba content was 98 ppm.

In conclusion, the lead content was less than 1.0 ppm, and therefore below the detection limit in all enamel, emulsion interior and emulsion exterior paints that were analyzed. No fungus or algae growth were observed after 5 months of exposure. In the enamel paints that were analyzed, the lead, chromium, cadmium, mercury and antimony content were less than 1.0 ppm and therefore below the detection limit. However the content of cobalt and barium were found to be more than 5 g/cm³, which can be considered as toxic.