Manganese levels and chemical fractionation in street dust in South Africa

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Abstract:

Mn in street dust and soil from selected roads was studied to assess the contribution of combustion of vehicular methylcyclopentadienyl manganese tricarbonyl (MMT) to Mn levels and distribution in Pretoria, South Africa. Total Mn concentrations ranged from (329.1-863.9 μg g−1) for dust and (215.8-450.6 μg g−1) for soil. These values were significantly higher than the mean value (278.9 μg g−1) found on soil from a rural environment in Pretoria. The lowest value for the dust sample (329.1 μg g−1) was close to the mean background level of 330 μg g−1 for Mn in soil. Mn distribution in the samples was most in the residual fraction (178.18-487.50 μg g−1) and (140.76-293.40 μg g−1) for dust and soil respectively. Mn in the other fractions were 56.45-202.60 μg g−1 oxides, 90.71-45.34 μg g−1 organic, 45.36-12.65 μg g−1 carbonates and 1.98-6.72 μg g−1 exchangeable for dust and 32.54-167.31 μg g−1 oxides, 34.23-70.45 μg g−1 organic, 10.98-30.45 μg g−1 carbonate and 1.0-4.87 μg g−1 exchangeable for soil. Major source of Mn determined was mainly from the combustion of vehicular MMT.

Keywords:
manganese levels, chemical fractionation, street dust, roadside soil, South Africa, combustion, MMT, vehicle emissions, trace metals, environmental pollution

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