

## Analysis of metals in particulate matter and street dust at the industrial and traffic sampling sites in the Czech Republic

M. Vojtěšek<sup>1,2</sup>, P. Mikuška<sup>1</sup>, R. Ličbinský<sup>3</sup>, V. Adamec<sup>3</sup> and K. Křůmal<sup>1,4</sup>

<sup>1</sup>Institute of Analytical Chemistry AS CR, v. v. i., Veveří 97, 602 00, Brno, Czech Republic

<sup>2</sup>Faculty of Science, Masaryk University, Kotlářská 2, 602 00, Brno, Czech Republic

<sup>3</sup>Transport Research Centre, Lišeňská 33a, 636 00, Brno, Czech Republic

<sup>4</sup>Faculty of Chemistry, Brno University of Technology, Purkyňova 464/118, 612 00, Brno, Czech Republic

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Particulate matter (PM) is emitted into air from various sources (traffic, industry etc.). The PM affects our environment especially human health because it contains many toxic chemical substances. Some of them, i.e. PAHs, Cd, As etc., may cause serious disease (WHO, 2004) and their occurrence in air is regulated by legislation.

The sampling of PM<sub>10</sub> and PM<sub>2.5</sub> and street dust was performed during a week in winter (January) 2009 at two sites with different sources. The first site (Brno, Kotlářská street) is influenced mainly by traffic while the second one (Ostrava, Bartovice) by steel industry. The PM<sub>10</sub> and PM<sub>2.5</sub> samples were collected onto cellulose-nitrate filters (1.2 µm, 47 mm, Millipore) using a middle-volume sampler Leckel MVS6 (2.3 m<sup>3</sup>/h) equipped with PM<sub>10</sub> or PM<sub>2.5</sub> inlet. Cellulose-nitrate filters were digested in nitric acid at microwave device UniClever (Plazmatronika, Poland). The samples of street dust were collected by sweeping with broom and by vacuum cleaner at the same place where the PM was sampled. The street dust was then fractionated into 3 sizes (≤ 50 µm (F50), 50-100 µm (F100) and 100-400 µm (F400)) and digested in a mixture of nitric and sulphuric acid at microwave device UniClever. Integrated 7-days samples of PM and street dust were analysed for 15 selected elements employing an ICP-MS (Agilent, Japan).

The results show that the concentrations of metals in PM<sub>10</sub> and PM<sub>2.5</sub> are higher in Ostrava than in Brno. Ni, Cu, As, Mo, Pd and Cd were mainly observed in PM<sub>10</sub> in Brno while Mg, Al, Ca and Fe were predominantly found in the same fraction in Ostrava. Cr, Mn, Zn and Pb were in large extent identified in PM<sub>2.5</sub> at both sites. In addition, Ni, Cu, As, Mo, Sb and Cd were mainly found in fraction PM<sub>2.5</sub> in Ostrava.

Ca, Zn, Mo and Cd were in large extent measured in street dust fractions F50 and F100 in Ostrava while in Brno Mg, Al, Mn and Pd were predominantly found in the same fractions of street dust. Al, Cr and Mn were mostly observed in street dust fraction F400 in Ostrava while in Brno Cd and Ca were mainly found in the same fraction of street dust. Fe, Ni, Cu, As, Sb and Pb were mainly obtained in the size fractions of street dust F50 and F100 at

both sites. Concentrations and other details will be presented.

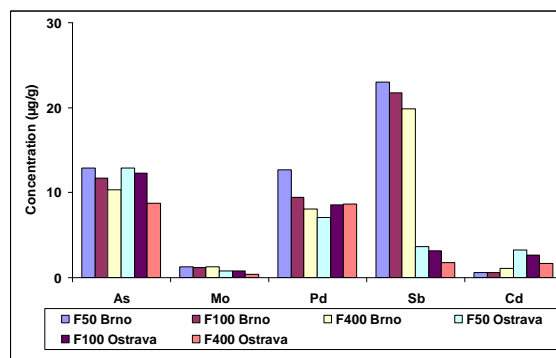


Figure 1. Concentrations of As, Mo, Pd, Sb and Cd in street dust in size fraction F50, F100 and F400 in Brno and Ostrava

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WHO, THE PEP, UNECE, Transport-related health effects with a particular focus on children, 2004.