Organic compounds in PM2.5 aerosol in Ostrava (Czech Republic)

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Atmospheric particulate matter (PM) is known to play an important role in many environmental problems. During last years much attention has been paid to the identification of emission sources of PM. To track the contributions of the main sources to composition of atmospheric aerosols, various source-specific organic and inorganic tracers are analysed in collected PM (Křůmal *et al.*, 2010; Křůmal *et al.*, 2013).

Atmospheric aerosols in the size fraction PM2.5 were sampled over 24-h periods using the high-volume sampler (DHA-80, Digitel, 30 m^3/h) on quartz filters during winter period of 2012 (26. 1. – 20. 2.) in industrial city Ostrava.

Collected aerosols were analysed for monosaccharide anhydrides (MAs), resin acids (RAs), methoxyphenols (MPs), monosaccharides (MSs), disaccharides (DSs), sugar alcohols (SAs), alkanes, hopanes/steranes (H/S) and polyaromatic hydrocarbons (PAHs). Analysis of MAs, RAs, MPs, MSs, DSs and SAs includes extraction of parts of filters with mixture dichloromethane/methanol (1:1 v/v) under ultrasonic agitation, derivatization of extracts with mixture of MSTFA/TMCS, dryness, redissolution in hexane and GC-MS analysis. Analysis of alkanes, H/S and PAHs includes extraction of parts of filters with mixture of dichlormethane/hexane (1:1 v/v), fractionation on column with silicagel, dryness to 1 mL and GC-MS analysis.

Analysed compounds include:

- MAs: levoglucosan, mannosan and galactosan.
- RAs: abietic and dehydroabietic acid.
- MPs: vanillic and syringic acid, vanillin and syringol
- MSs: xylose, fructose, galactose and glucose.
- DSs: sucrose and trehalose.
- SAs: arabitol, manitol, sorbitol and inositol.
- Alkanes: C8 – C40.
- H/S: 17*α*(H),21*β*(H)-hopane, 22*RS*-17α(H),21β (H)-homohopane, 17*α*(H),21*β*(H)-norhopane and *ααα* (20*R*)-cholestane.
- PAHs: fluorene, phenanthrene, anthracene, fluoranthene, pyrene, retene, benzo[*a*]anthracene, chrysene, benzo[*b*+*k*]fluoranthene, benzo[*e*]pyrene, benzo[*a*]pyrene, perylene, indeno[1,2,3-*c*,*d*]pyrene, dibenzo[*a*,*h*]anthracene benzo[*g*,*h*,*i*]perylene and picene.

Figure 1 compares the concentrations of PM2.5 aerosol and sum of analysed organic compounds in Ostrava. It is evident that course between the concentrations of PM2.5 and sum of organic compounds is similar. The atmosphere in industrial city Ostrava was very polluted by PM2.5 particles.

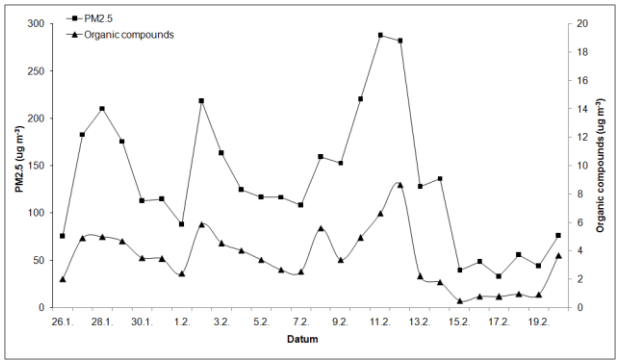

Figure 1. Mass concentrations of PM2.5 (μg.m^{-3}) and sum of analysed organic compounds (μg.m^{-3}) in Ostrava.

Detailed results including comparison of analysed organic compounds in winter in Ostrava will be presented.

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