LARGE SCALE AIR MONITORING: BIOLOGICAL INDICATORS VERSUS AIR PARTICULATE MATTER

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Abstract

Biological indicator organisms are widely used for monitoring and banking purposes since many years. Although the complexity of the interactions between bioorganisms and their environment is generally not easily comprehensible, environmental quality assessment using the bioindicator approach offers some convincing advantages compared to direct analysis of soil, water, or air. Direct measurement of air particulates is restricted to experienced laboratories with access to expensive sampling equipment. Additionally, the amount of material collected generally is just enough for one determination per sampling and no multidimensional characterization might be possible. Further, fluctuations in air masses have a pronounced effect on the results from air filter sampling. Combining the integrating property of bioindicators with the world wide availability and uniform matrix characteristics of air particulates as a prerequisite for global monitoring of air pollution will be discussed. A new approach for sampling urban dust using large volume filtering devices installed in air conditioners of large hotel buildings is assessed. A first experiment was initiated to collect air particulates (300 to 500 g each) from a number of hotels during a period of three to four months by successive vacuum cleaning of used inlet filters from high volume air conditioning installations reflecting average concentrations per three months in different large cities. This approach is expected to be upgraded and applied for global monitoring. Highly positive correlated elements were found in lichen such as K/S, Zn/P, the rare earth elements (REE) and a significant negative correlation between Hg and Cu was observed in these samples. The ratio of concentrations of elements in dust and *Usnea spp.* is highest for Cr, Zn, and Fe (400 - 200) and lowest for elements such as Ca, Rb, and Sr (20-10).