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AN EXAMPLE OF THE USE OF BIO-INDICATORS FOR AIR QUALITY ASSESSMENT IN AREAS WITH HIGH INDUSTRIAL PRESENCE

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Abstract

Air pollution is an increasing critical issue and the focus of innumerable studies and monitoring activities. In addition to automatic monitoring systems typically used to measure fine dust, ozone, nitrogen oxide and sulfur oxide, the use of bioaccumulation monitors can also be exploited, especially when monitoring large areas. The advantage of biomarkers is the very low costs involved compared to traditional monitoring systems. Bio-indicator techniques do not measure directly air quality or atmospheric pollution, but rather estimate the changes in reactive components in ecosystems to pollution. So rather than being an alternative method to the traditional measurements, bio-indicators provide detailed information on specific areas thus optimizing the location of the measuring instruments. Epiphytic lichens are the most suitable species for bio-indicator monitoring. A case study of a large area located in northern Italy, characterized by a high concentration of industrial activities in the field of wood and chipboard processing is reported in this paper. An analysis was performed with fruticose epiphytic lichens (*Pseudovernia furfuracea*) as bio-indicators. These lichens can assimilate and metabolize various substances and, in particular, the heavy metals from the surrounding atmosphere. Several bio-monitoring campaigns were conducted in order to monitor the trend of airborne heavy metals, and data statistically processed, in order to highlight the role and incidence of said industrial activities on the distribution and concentrations pattern of these pollutants. The approach used in the case study included application of biotic indices, statistical analysis, aimed at data interpretation the data, analysis of pollutants dispersion and influence of their background distribution in the investigated area to highlight potential criticalities. As a verification of the bio-indicators results reliability, a survey of fine dust and powder distribution in the area was conducted in the same period and on the same biological detection stations. This test was also positive, confirming the reliability of the study as conducted.

Key words: air pollution, bio-indicators, lichens, monitoring

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