BIOMONITORING OF AIR POLLUTION USING LICHENS IN RAJOURI DISTRICT OF JAMMU AND KASHMIR STATE OF INDIA

Mamta Bhat, Susheel Verma and D. K. Upreti

School of Biosicences and Biotechnology, BGSB University, India

ABSTRACT

Quality of air is a serious concern to humans throughout the world. It has become a serious health hazard as it is leading to many chronic respiratory disorders. One of the major concerns before scientists and environmentalists world over is the assessment of magnitude and variety of pollutants in the air. In developed world and some of the developing countries highly sophisticated electronic gadgets are being used for monitoring of the pollution level in the air. An alternate method to this high cost technology is the use of living organisms for monitoring the level of pollutants in the air. Lichens as whole are one such group of organisms which are highly versatile monitors of air pollution, but some species are highly sensitive to the level of pollution in the air. One such species is Hyperphyscia adglutinata (Floerke) Mayrh and Poelt, a common foliose lichen of the region was used for biomonitoring for eight heavy metals including Lead, Iron, Copper, Chromium, Zinc, Cadmium, Nickel and Mercury in the air of Rajouri district of Jammu and Kashmir state of India. To achieve this lichen transplantation experiments were conducted and as such eleven sites were selected for this purpose. Inductively Coupled Plasma Mass Spectroscopy (ICP -MS) of the transplanted lichen samples was done which revealed significant concentration of all the heavy metals. Lichen samples transplanted near the city centre revealed maximum concentration of all the heavy metals i.e 6912.7 µg g-1 of dry weight. However, their minimum concentration was observed as 4421.5 µg g-1 of dry weight at site located away from the city centre. The data generated thus helped us in assessing air pollution levels and enabling us to correlate the role of this lichen species in biomonitoring by expanding its scope to the other parts of the state and country.

References:

1. Bartoli, A., Cardarelli,C., Achilli,M., Campanella,L., Ravera, S. and Massari, G. 1997. Quality assessment of Maremma Laziale area using epiphytic lichens. Allionia. 35: 69 – 85.

2. Faltynowicz, W. 1997. Lichens as indicators of bog – community degeneration. Acta Mycol. 32: 347 – 368.

3. Malysheva, N.V. 1998. Lichens of St. Petersburg.3. The influence of town environment and lichen indication of atmospheric pollution. Bot. Zh. St. Petersburg. 83: 39 – 45.

4. Ockenden, W.A., Steinnes, E., Parker, C. and Jones, K.C. 1998. Observations on persistent organic pollutants: Implications for their use as passive air samplers and for pop CYCLING. Envir. Sci. Technol. 32: 2721 – 2726.

5. Rodrigo, A., Avila, A. and Gomez – Bolea, A. 1999. Trace metal contents in Parmelia caperata (L.) Ach. Compared to bulk deposition, through fall and leafwash fluxes in two holm oak forests in Montseny. (NE Spain). Atmos. Envir. 33: 359 – 367.

6. Van Doven, H. F. and Ter – Braak, C. J. F. 1999. Ranking of epiphytic lichen sensitivity to air pollution using survey data: A comparison of indicator scales. Lichenologist. 31: 27 – 39.