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NATURE'S SILENT ALARM: THE TREES OF ISTANBUL SIGNAL HEAVY METAL POLLUTION

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Abstract

Biomonitor plants, which serve as biological indicators, play a crucial role in air quality monitoring. Biomonitoring is generally defined as the use of biological organisms or materials to obtain quantitative data on specific characteristics of the biosphere. In this study, the potential use of four different plant taxa; *Robinia pseudoacacia* L., *Acer negundo* L., *Pinus brutia* Ten., and *Cupressocyparis leylandii* (A.B.Jacks. & Dallim.) Dallim as biomonitors of air pollution was investigated. The research was conducted in three distinct locations within the province of Istanbul: Bakırköy Courthouse Open Car Park, İspark Florya Social Facilities Open Car Park, and Haciosman Atatürk Urban Forest. Leaf samples were collected during the 2023 vegetation period. Heavy metal concentrations of Pb, Cd, Ni, Cr, Co, and Cu were determined using inductively coupled plasma-mass spectrometry (ICP-MS). Prior to analysis, the leaf samples were digested using a closed microwave digestion system with appropriate solvent mixtures to convert them into liquid form. The obtained data were statistically analyzed using SPSS Statistics software to determine differences between broadleaf and needleleaf plant species, as well as among the three locations. The findings revealed that heavy metal accumulation was significantly higher in areas exposed to intense urban activity and vehicular emissions. The Bakırköy Courthouse site exhibited the highest average concentrations for all measured heavy metals: Pb (10.81 mg/kg), Cd (0.06 mg/kg), Ni (4.70 mg/kg), Cr (3.92 mg/kg), Co (0.39 mg/kg), and Cu (6.62 mg/kg). Selected plants effectively monitor urban air pollution.

Key words: air quality, biomonitoring plants, car park planting, heavy metal, landscape planning

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