

## **Phytoremediation of particulate matter pollution urban vegetation**

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### **Abstract**

One of the most dangerous pollutant created by traffic is particular matter – PM. They can be suspended in the air even for weeks as aerosols, and when inhaled can have carcinogenic, allergic and mutagenic effects. If pollutants have been emitted to the atmosphere only possible method to clean the air is via environmental technology - phytoremediation. It involves growing plants on the surface of which PM are deposited. Nevertheless, air pollution has also negative effects on efficiency of photosynthetic apparatus but still there is little data towards such effects of PM.

In this work we focused on the potential of PM accumulation on leaves of trees growing in Polish cities with different level of particulate matter in air. We also studied the reduction of urban particulate matter concentration by trees and shrubs and meadows growing in roadside vegetation barriers and the impact of PM on plants health.

Amount of PM was measured in two categories (surface-PM – deposited on the leaf surface and in wax-PM – phytostabilized in waxes) and three size fractions (10-100 $\mu$ m, 2.5-10 $\mu$ m and 0.2-2.5 $\mu$ m). For the same plants we also measured the concentration of heavy metals. To define the impact of PM on plants vitality we used efficiency of photosynthetic apparatus and a chlorophyll fluorescence. We found significant differences in PM amount between plants growing in different cities corresponding with amount of PM in atmosphere. The highest amount of PM was measured on trees growing in Cracow – which have one of the highest levels of PM in air in Europe. We also found that green barriers can significantly reduce the spread of traffic PM, heavy metals pollution. Moreover, flowering meadows can also be more efficient in pollution reduction than regular lawns. However, for almost all tested species parameters describing photosynthesis and chlorophyll a fluorescence was reduced in comparison with the control plants.

At the present time, phytoremediation technology is becoming more and more popular around the world. In this work we want also present new trends and research plans on the ability of plants to phytoremediate various types of pollutants from the air.

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