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The role of acoustic screens in distribution of technogenic magnetic particles and chemical pollution in roadside soil

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Roads constructed nowadays should by all means be functional for their motorized users but at the same time their effect on the environment ought to be limited to the minimum. Despite the existence of various methods for preventing from negative influence of roads on the environment, there is still lack of adequate techniques to monitor and reduce the spreading of roadside pollution in the air and soils. The aim of the study was to assess the influence of acoustic screens on spreading and deposition of solid pollutants deriving from car emissions, based on their quantitative and qualitative analysis. During this study, measurements of magnetic susceptibility and analyses of heavy metals as well as Pt and Rh contents in soil and plant samples (Taraxacum officinale, Plantago major, Parthenocissus quinquefolia) collected near different kinds of acoustic screens ("green walls", Plexiglass, sawdust concrete, steel panels and earth embankments) have been done. Previous investigations showed showed that most of traffic emission is deposited in the close vicinity of the roads (up to 10 m) and the level of contamination decreased with increasing distance from the road edge. However, the results of this project indicate that, in the area where the acoustic screens are located, this distribution is disturbed and the additional enrichment of heavy metals in soil about 10 – 15 m behind screens is observed. Spatial distribution of heavy metal contents in soil samples corresponds to its magnetic susceptibility values. High contents of Fe, Zn, Mn and Pb was observed next to acoustic screens made of sawdust concrete and steel panels. Additionally, concentration of Zn in soil samples collected close to these screens exceeded threshold value. Analyses of plants showed that the highest content of examined elements and highest values of magnetic susceptibility were recorded near road edge. What is more, samples of Parthenocissus quinquefolia collected at height 0.2 m were characterized by higher contents of Cu, Pb, Zn, Mn and Fe and higher magnetic susceptibility values than samples collected at height 2 m.