AJES
ASIAN JOURNAL OF ENVIRONMENTAL SCIENCE ■ VOLUME 7 | ISSUE 2 | DECEMBER, 2012 | 186-195

RESEARCH ARTICLE

Study on heavy metal pollution in plants and soil at road side location of urban area

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Article Chronicle :
Received **:**
11.07.2012;
Revised **:**
14.09.2012;
Accepted **:**
30.10.2012

SUMMARY : In this study, *Azadirachta indica*, a commonly grown a prevalent tree in Madurai town was used to monitor the influence of the heavy metal pollution caused by traffic. Samples were collected during the period May, 2011 – March, 2012 from six different locations. The concentration of heavy metals (Fe, Mn, Zn and Cu) were determined from plant leaves using Flame Atomic Absorption Spectroscopy (FAAS). Besides, heavy metal content were examined in the surface soil (0 -20 cm) and sub-surface soil (20-40 cm), samples were collected from each location. The heavy metals determined from leaves and soil was evaluated statistically. A meaningful correlation between heavy metal concentration in plant and soil sample was observed. In addition the metal concentration in *Azadirachta indica* have been compared with critical heavy metal level and phytotoxic level in the literature. The all mean data of metal concentration in leaves were found to be below the lower limits of toxicity except Fe and Mn. According to the metal concentration in surface soil and sub-surface soil studied, the concentration of metal was found to be Fe (16.1) > Mn (9.4) > Zn (5.9) > Cu (2.3) which have been found to lie below the critical limits. Though, they were well below the critical limits, the human and other living organisms are under the risk of heavy metal pollution if they are not checked and controlled. Overall conclusion is that traffic related to heavy metal was significant to urban systems and monitoring of the metal content of plants on roadside were beneficial in multiple ways.

HOW TO CITE THIS ARTICLE : Thambavani, D. Sarala and Vathana, M. Vidya (2012). Study on heavy metal pollution in plants and soil at road side location of urban area. *Asian J. Environ. Sci.*, **7** (2): 186-195.

Key Words :
Heavy metal, Soil, Critical limit, Pollution, Toxicity

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An immense interest has been focused on the toxic effect of heavy metals in the plants as most of the soils act as sink for metals. Heavy metal pollution of biosphere is increasing drastically due to industrialization and anthropogenic activities. The contamination of soils by heavy metals is one of the most serious environmental problems and has significant implications for human health. Numerous efforts have been made to develop technologies for the remediation of contaminated soils, including *ex situ* washing with physical–chemical methods and the *in situ* immobilization of metal pollutants (Rulkens *et al.*, 1995). These methods of cleanup are generally very costly, and often harmful to properties of soil (*i.e.* texture, organic matter, micro organisms) that are desirable for the restoration of contaminated sites. The phyto-extraction of heavy metals from contaminated soils has attracted attention for its low cost of implementation and many environmental benefits (McGrath *et al.*, 1993; Salt *et al.*, 1998). Plant species behave differently regarding trace metal uptake (Maisto *et al.*, 2004). Some of them have a low uptake of the metal at very high soil concentrations (excluders); other species have high metal content in their tissues compared to a very low soil metal concentration reflecting soil metal contents/indicators (Maisto *et al.*, 2004). However, the availability of metal uptake depends on the total heavy metal content of the soil and the proportion of their mobile and bio available form which are generally controlled by the texture and the other physiochemical properties of soils (Selim and Sparks, 2001). In recent years, environmental concern for air quality has lead to