

ASSESSMENT OF LEAD AND CADMIUM CONTAMINATION IN ROADSIDE SOILS AND PLANTS FROM CHANIA CITY (GREECE).

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EXTENDED ABSTRACT

Heavy metals, such as Pb and Cd are common pollutants in urban environments mainly due to traffic emissions. This study investigated the pollution of Pb and Cd in urban soils and plants of Chania city. The soil samples were collected from the roadside of the major squares, parks and traffic islands at three depths (0-5cm, 5-15cm and 15-30cm). The leaves of *Nerium oleander* L. (Oleander) were used as biomonitors of heavy metal contamination and they were collected next to the soil sampling sites. The total and bioavailable forms of Pb and Cd in soils were extracted with boiling Aqua Regia and DTPA respectively. The total concentrations of Pb and Cd in unwashed leaves of *Nerium oleander* L. were extracted with concentrated nitric acid. The content of the pollutants in soils and leaves was determined by using flame Atomic Absorption Spectrometry.

Total soil concentration data in the three depths, according to Dutch classification scheme (environmental guideline for metal pollution in soils) indicated that the studied soils can be considered medium polluted of Pb and Cd. In all sampling sites, the total contents of Pb and Cd decreased with depth suggesting undisturbed conditions and airborne deposition from vehicle exhausts. The highest total concentrations of Pb and Cd were found in the centre of the city (Agora square) mainly due to heavy traffic load. The bioavailable concentrations of the studied metals were low maybe due to basic soil pH and to high content of free calcium carbonate and decreased slightly with soil depth. The relative availability of Pb was about four times higher than Cd. The available concentrations and the bioavailability decreased slightly with soil depth for both metals maybe due to the reduction of the organic matter content and the increase of free calcium carbonate and pH values. The highest available concentrations of Pb and Cd in the surface (0-5 cm) and subsurface (5-15 cm) soils were found in the centre of the city (Agora square). Although Pb seemed to be more available in soils, for plant uptake, the *Nerium oleander* plants in Chania city can be considered unpolluted of Pb and contaminated of Cd, according to literature criteria. The main cause of the relative high concentrations of Cd in *Nerium oleander* plants was that the determination of the studied metals was carried out in unwashed leaves and therefore, there was aerial deposition of Cd due to tire abrasion. The major sources of Pb in urban environments are mainly the leaded fuel used in the past and the paints, so the airborne deposition of Pb is lower than the past decades. Also, Pb is accumulated in the roots, in great concentrations and the translocation of Pb from the roots to tops is limited.

Key words: Heavy metals, urban soil, bioavailability, traffic emissions